MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association, Northern Minnesota Medical Association and Minneapolis Surgical Society

---

Owned and Published by
The Minnesota State Medical Association
Under the Direction of Its

VOLUME VIII

JANUARY TO DECEMBER, 1925

EDITORIAL AND BUSINESS OFFICES

Guardian Life Bldg. - - - Saint Paul, Minn.

BUSINESS MANAGER

J. R. Bruce

VOLUME VIII

JAN 16 1925
Medical Lib.

NUMBER 1

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association Northern Minnesota Medical Association and Minneapolis Surgical Society

JANUARY, 1925

CONTENTS

(Continued on Advertising Page III)

Owned and Published Monthly by

THE MINNESOTA STATE MEDICAL ASSOCIATION

BUSINESS MANAGER
J. R. BRUCE, 402 Guardian Life Bldg., Saint Paul
Telephone: Cedar 1683
201 Commercial Bldg., Minneapolis
Telephone: Atlantic 2716

Entered at the Post Office in Saint Paul as second class mail matter.
Accepted for mailing at the special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized July 13, 1918.

Subscription Price { $3.00 yearly, Domestic
$3.50 yearly, Foreign

INFANT DIET MEAD'S MATERIALS

INFANT FEEDING

THE PHYSICIAN HIMSELF is the most important factor in the successful feeding of infants.

BUT TWO OTHER FACTORS ENTER into the equation—

THE MOST IMPORTANT BEING the physician's control of the case;

AND NEXT IN IMPORTANCE the reliability of his infant diet materials.

MEAD'S INFANT DIET MATERIALS satisfy this last requirement. They are as reliable as it is possible for us to make them;

BUT THEIR INDIRECT INFLUENCE on the other requirement, the doctor's control over the feeding case, is even of greater value.

MEAD'S INFANT DIET MATERIALS are marketed to the laity only on the physician's prescription—No feeding directions accompany trade packages—The mother gets her information only from the doctor who changes the feedings from time to time to meet the nutritional requirements of the growing baby. *He therefore CONTROLS the case.*

THE PHYSICIAN can, with three MEAD diet materials, plus his skill and his control, satisfy the nutritional requirements of nearly all infants entrusted to his care.

MEAD'S DEXTRI-MALTOSE (carbohydrate) cow's milk and water, combined in proportions to suit the individual baby, meets successfully the requirements of most infants.

FOR OTHER INFANTS where additional carbohydrate is not indicated but additional protein is indicated (such as in Diarrhoea, Marasmus, Colic in breast-fed infants, etc.), the use of CASEC (protein) in the cow's milk modification gives gratifying results.

MEAD'S COD LIVER OIL, a standardized antirachitic agent of known potency, protects all infants, whether breast or bottle fed, from Rickets and can be given in such small doses as not to upset the fat proportion of the baby's diet.

Samples and literature describing these three diet materials

MEAD'S DEXTRI-MALTOSE · MEAD'S STANDARDIZED COD LIVER OIL
MEAD'S CASEC *Sent at the physician's request*

MEAD JOHNSON & COMPANY
MAKERS OF INFANT DIET MATERIALS
EVANSVILLE, INDIANA, U. S. A.

MEAD'S DEXTRI-MALTOSE

MINNESOTA MEDICINE

Journal of the Minnesota State Medical Association, Southern Minnesota Medical Association Northern Minnesota Medical Association and Minneapolis Surgical Society

VOL. VIII JANUARY, 1925 No. 1

ORIGINAL ARTICLES

UNUSUAL FEATURES OF CARCINOMA*

H. E. ROBERTSON, M.D.
Section on Pathologic Anatomy, Mayo Clinic
Rochester, Minnesota

One of the inherent defects of all language is that general terms are often so ill defined that their meaning to various individuals is sufficiently different to render difficult any real community of thought concerning them. This difficulty is more real than apparent. By unconsciously selecting the middle ground, we employ ideographs with solid centers of common knowledge, and thus are fairly successful in an interchange of thought. It is only when our minds begin to wander along the margins or peripheries of these generalizations that we find ourselves involved in a hazy, ill defined maze of contradictions.

No better illustration of this fact can be found than the word "cancer" or "carcinoma". The safe middle ground occupied by the majority of us, signifies the definite notion of an ulcerating, metastasizing, destructive, parasitic growth of epithelial cells and fibrous stroma, a growth which, untreated, inevitably produces the death of its host in the average time of about one year. So long as this concept obtains, there is not the slightest difficulty in the interchange of ideas involving the use of the word "cancer." Everyone, at least every doctor, knows or thinks he knows exactly what is meant by the term, and any conversational difficulty in its use is practically negligible. It is true that the limits of the term are rather wide, inasmuch as cancers vary considerably in rate and manner of growth, appearance, and factors of malignancy, such as infiltration, metastasis and destructive or obstructive replacement. Such variability, however, being well understood, the term still conveys reasonably exact concepts.

*Read before the annual meeting of the Minnesota State Medical Association, St. Cloud, October 9, 1924.

The current discussions on the subject, as well as those in the literature, are largely concerned with this central core of our knowledge, and with the majority of its phases we are all fairly familiar. Our only excuse for the constant repetition which is encountered at every point, is the necessity to place deserved emphasis on those features which may awaken us, and, through us, the public, to early recognition, and, with it, early radical treatment. It is a life saving propaganda, and, as such, fully justifies the risk of over-stuffing ourselves and our clients, thus perhaps even defeating the results we desire to accomplish.

Hence it may be all the more desirable occasionally to deviate from the beaten paths of our knowledge, and to wander along the borders where haze obscures the mental pictures, where clear-cut conceptions become impossible, and generalizations no longer can be used. This effort is much easier for the student of pathologic anatomy who sees in the human body many transitions between normal and abnormal, which are so far below the level of clinical phenomena that they often remain only theoretic in interest.

With this object in view, it may be of value to consider a few of the features of carcinoma which do not conform to the usual rule. By no means the least interesting of these is unusual duration. Carcinoma of extremely short duration, with a total clinical course of only a few weeks, is by no means uncommon, but if a cancer lasts for more than two years there naturally arises a question as to whether the growth was actually malignant, although all of us have seen instances of this.

The question of the relative speed that we may expect from any given growth often becomes of clinical importance. If we could be certain that a given tumor was going to proceed very slowly, it would be much more worth while to perform a more thorough palliative operation, or even to attempt a radical cure. I remember my incredulity when the late Dr. J. Clark Stuart told me of an adenocarcinoma of the breast which had existed

for seventeen years. Since then I have seen a number of very scirrhous carcinomas of the breast of extremely slow growth, one lasting eight, and another ten years.

A similar sort of growth may be found in the gallbladder. I have discovered two of these, of such minor clinical significance as to be missed in the examination, the patient's death coming about from other causes, and of such strict localization that the malignant nature of the process could not be determined with assurance without microscopic study. One of these cases was noted a year and a half after cholecystectomy; it was probable that the cancer was beginning to grow at the time of operation.

Another organ prone to this sort of growth is the pancreas, particularly around the papilla of Vater. If it were not for the early involvement of the common bile duct, these carcinomas undoubtedly would have much longer periods of growth. The point is worth considering in the question of relief of the patients. It is by no means uncommon for a tiny growth to produce a total obstruction of the common bile duct, when operation might have afforded a number of years of relief.

The growths in the three locations mentioned have a common characteristic of a superabundance of connective tissue, small groups of cells or single cells representing the epithelial element and a minimal number of lymphocytes. The epithelial cells may form perfect glands, or may show only occasional globules of mucus. Although carcinomas in other organs may also be of exceedingly slow growth, carcinoma of the larynx deserves special mention. Occasionally hoarseness may be the only symptom in these cases, and may exist for a number of years before any other disability appears. These carcinomas are just as slow, as a rule, to metastasize as they are to grow, and the determination of their true character by the surgeon and the pathologist justifies much more radical efforts, even at a late period, to effect a cure.

I have just mentioned the appearance of mucous droplets in cells as a differential characteristic. This important sign for the differentiation of growths arising from any of the glandular epithelial structures has not received due emphasis. It is quite evident that the mucus-producing epithelial cell is the least differentiated, and that growths from these cells retain with exceeding tenacity this particular characteristic. We are all familiar with the common so-called colloid carcinoma, *so-called* colloid because it is really a collection of mucus large enough to be appreciable to the naked eye. A large proportion of the growths from the intestinal tract and many other glandular organs are, at least microscopically, of this type, the collections of mucus often reaching considerable amounts. Even when no demonstrable mucus may be found, the individual cells will practically always show in one place or another, large round droplets, quite clear, but in actual test almost indisputably composed of mucus. This point is not only of rather major importance to professional pathologists for the identification of any given growth, but probably is of some importance to the patient. In proportion to the rapidity of the growth, the signs of mucus usually diminish rapidly and, consequently, this element often is a very significant factor in the prognosis. The huge colloid masses that are occasionally seen, particularly in the stomach and in the region of the cecum, are by that same token often of a very low degree of malignancy.

Several years ago, when it became the custom for the surgeon to have at his elbow a pathologist, when the importance of early operations on malignant growths was emphasized, and when the borderlines of diagnosis between inflammatory or involutionary hyperplasias and real carcinomas was a field for debate, there was considerable comment on what were then designated "precancerous" conditions. Many times this term was used without any clear conception of its meaning. Sometimes it referred to a lacerated, eroded cervix, a hypertrophic endometrium, an ulcer of the stomach, a cystic breast, and so forth. The notion had a harmful phase, inasmuch as a considerable amount of destructive surgery was performed in the name of "precancer". But its usefulness probably outweighed the harm, inasmuch as attention was very properly focused on the early appearances of carcinomas at a time when their operability would be most favorable. At the present time, if I have correctly interpreted the matter, there is not nearly so much stressing of "precancers", the pendulum as usual having swung perhaps even too far in the other direction. We are rather insistent that the pathologist tell us whether a growth is malignant or not, and we want definite opinions on this point.

More careful clinical records with follow-up histories have shown us that the fundamental idea underlying the thought of precancerous conditions contains a very useful element. For example, not many years ago and perhaps even now, in some quarters, the surgeon demanded to know whether a given papilloma of the urinary bladder was malignant or benign. If the growth penetrated the bladder wall or showed an undue number of mitotic figures, the pathologist quite promptly pronounced it malignant. But many of the patients with these growths were given a fairly clean bill of health. We are quite certain at this time that every one of these growths in the urinary bladder, in the ureter or in the pelvis of the kidney are really carcinomatous from the beginning. True, they may occasionally be of a very low degree of malignancy, and local excision may prove sufficient for cure. Some of them, indeed, are so insignificant that to apply to them the term "carcinoma" stretches the term almost beyond reason. Hence, the designation "potential carcinoma" has been employed, and at the present state of our knowledge is useful.

To illustrate, in the cortex of the kidney, the pathologist quite frequently runs across tiny whitish or yellowish nodules, varying from almost microscopic dimensions to many centimeters in diameter. From his standpoint these growths have most of the essential characteristics of carcinoma of the kidney. The large majority of them, however, never reach important dimensions and to make the diagnosis of carcinoma of the kidney in the presence of a pin-head nodule is to a clinician almost a *reductio ad absurdum*. Hence, the applicability of the term "potential carcinoma", for that is exactly what these growths are. They may never reach the level of clinical signs, most of them never will, yet every one of them constitutes a potential menace to the individual. How many of these potentialities exist throughout the body, we are unable to state with any degree of certainty, but a few of them are quite clearly established. Adenomas of the cortex of the adrenal, and in the anterior lobe of the pituitary, in most instances entirely innocent, occasionally exhibit strongly destructive properties with only one change in their usual character, and that is their rate of growth. Every one of them is potentially malignant, only waiting for a release of the inhibition which fortunately usually retards its progress. The true position of polypi of the intestine and stomach in this respect is not clear, but there certainly exist types of polypi in the large intestine which are fundamentally true carcinomas, but should probably be classed clinically as potential. Whether the same statement can be made in regard to polypi of the gallbladder and uterus is still a debatable point. The important conclusion seems to be justified that in the adult, after the age of thirty-five at least, there exist myriads, actually myriads, of potentially malignant growths. The wonder is not that a carcinoma develops or that multiple carcinomas are occasionally seen, but that any individual reaches the full three score years and ten without being overwhelmed by carcinoma of almost every variety.

The answer must consist in postulating an inhibitory influence, local, general, or both, on the disorderly growth of epithelial cells. Instances of this phenomenon are a daily occurrence, but it has been insufficiently stressed. The tiny carcinoma of the stomach, giving rise to huge inordinate metastatic growths in the liver or the pleuræ, does not excite sufficient comment. The local inhibition exhibited toward the growth in the stomach, and its almost complete absence in the liver or the pleural cells, is really an astonishing feature. Further study of many of these growths reveals a very marked change in their characters, the older, slower portions showing in their new habitat a rapidity of growth, a lack of differentiation, and a destructive character which occasionally gives the impression of an entirely different form of tumor. Careful study of some of these tumors and their metastatic productions shows that this inhibitory influence occasionally wavers; it is not a consistent property of any given organ, nor of the body as a whole. Under certain conditions the tumor's growth is quite manifestly inhibited, but later on the bars are down and the carcinoma runs wild. These carcinomatous bonds deserve much more careful study. Manifestly they are an inherent property of body cells or juices, varying from time to time, and are the only real intrinsic defensive mechanism against carcinoma. Quite possibly they might be influenced by external means, if we only knew the secret of their application. I do not know of a feature in the study of carcinoma which is more intriguing, or of more importance.

THE DESTRUCTIVE AND CONSTRUCTIVE SURGERY OF MALIGNANCY*

HARRY P. RITCHIE, M.D.
St. Paul

Surgery as exemplified by keen excision and dissection is one of the oldest measures in the treatment of malignancy. The objections to this mode of attack are well known: (1) the possibility of grafting aberrant cells upon newly formed and succulent surfaces; (2) handling and manipulation enhancing glandular metastasis; (3) attempted incomplete removal; (4) creation of a defect with loss of function on the one hand and on the other a cosmetic deformity, either of which may be socially ostracising. The first three are purely surgical problems supposedly under the manual control of the surgeon and particularly his judgment. The fourth is the most important as it is a potent factor in causing the greatest and most frequent handicap in the treatment of this disease: delay in seeking advice. Fear of surgery and its scars is natural and leads not only to delay but to the acceptance of treatment by various agents at a time when the greatest expectation of a cure is surgical removal. The surgeon is also influenced. Because of a very estimable desire to leave a minimum scar he makes a close instead of wide excision.

In malignant tumors, the effort of surgery is destructive which must be balanced by plans for reconstruction. If construction can be made to equal destruction then the early cases will seek surgical removal. So far as my experience now goes, the hope of a cure, not a three-year or five-year but a cure without qualification, is a local growth widely removed.

Consideration of reparative steps is no new thought. Wherever function of a part or life itself is involved the procedures have been widely developed. The Polya operation, independently conceived in its principles by Dr. W. J. Mayo, developed in its details by him, has revolutionized the surgery of carcinoma of the stomach, justifying the attempt of wide removal even in gross involvement. While there are several plans for anastomosis, they carry extra steps often enough to unbalance the patient. Thought and consideration to the reparative problems developed this technic which has changed the whole aspect of the condition in this organ.

The Mikulicz operation for carcinoma of the sigmoid is almost always successful. It is not only an attempt at a cure but carries true constructive steps. Balfour's tube anastomosis, the various plans for reuniting the small bowel to the large in right sided malignancy are all illustrative. Coffey's procedures for carcinoma of the rectum are being widely considered because no satisfactory plans appear possible for establishing the continuity of the bowel in this location, but are only acceptable because inguinal colostomy as now done and cared for is not incompatible with health and comfort.

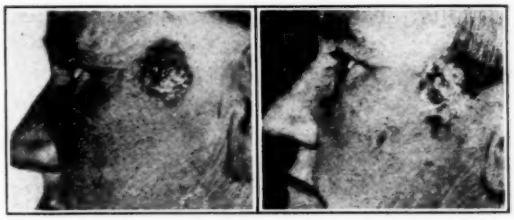

Fig. 1. A squamous celled carcinoma, removed by keen excision and immediately repaired by use of the thin Ollier-Thiersch graft. A great part of the result with this graft is due to contraction. A scar forms, so this method is not to be used in exposed places of the face.

In internal carcinoma surgery appears the proper procedure because in no other way can the situation be determined, and given only a fair chance its cures are many. The solution of the reparative problem is imperative, has received the most attention and is the most perfected.

External and accessible malignancy is now the most interesting field for study. Exposed, the new growth is open to extraneous influence; accessible, it is the most inviting field for the application of the various destructive agents of known and valued action or the use of inert preparations by the ignorant and unscrupulous. The discussion of the relative merits of destructive agents and study of their action must eventually yield results, but while we are waiting for the universal cure, it appears to me most reasonable to consider each case on the following well known questions and particularly in this order:

1. What is the pathology?
2. Is the growth local?
3. Can it be removed?
4. Can an acceptable repair be made?

*Presented before the annual meeting of the Minnesota State Medical Association, St. Cloud, October 9, 1924.

WHAT IS THE PATHOLOGY?

The pathology is essential. Most of the new growths are epithelial in origin. We know that there are several histological forms but they are frequently all grouped under the blanket term cancer. The laity surely so considers them and even among the profession it occasionally comes to our notice that there is laxity in this respect. We must have the original picture to make sure that we are dealing with a histologically malignant tumor and to make a keen distinction between the occasional sarcoma, the low grade odd tumors, the basal celled and squamous celled epithelial growth. The basal celled from clinical observation is local over many years of non-treatment, incomplete treatment and recurrence and gives us every chance for a cure, whereas the squamous and adeno may be early out of bounds. While in many instances a clinical differentiation is correct, it is surprising when cases are routinely checked how often a mistake is made. Biopsy is often necessary. The propriety of this procedure is debatable. My belief is that it is proper if followed by immediate treatment. Biopsy and delayed treatment invites inflammatory reaction, possible dissemination of the disease and is therefore to be deprecated.

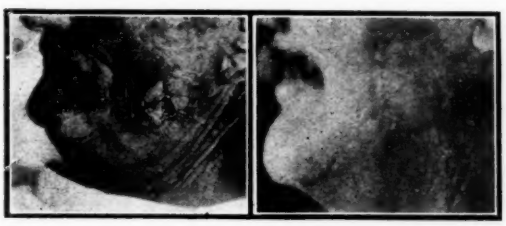

Fig. 2. A squamous celled carcinoma removed under local anesthesia by keen excision and the wound immediately repaired by the use of the full thickness graft of the Krause-Woulfe form. The resurrection of this graft is the greatest forward step in plastic surgery. The graft is thick and revascularizes and leaves a hardly appreciable scar. For use on the exposed places.

The histology is necessary but a clinical grouping is the greatest need. Broders has offered a four grade plan based upon cellular activity, a most important step in advance. If it were possible to join this with location, extent and glandular involvement of the growth it would be the greatest help. But we can agree that no longer can we study or discuss treatment or results from the general viewpoint of cancer.

IS THE GROWTH LOCAL?

The basal celled epithelioma is clinically local and usually runs true to form but there are occasional instances which indicate that there may be varieties of this growth. I have also seen squamous develop upon the apparently cured basal celled. With this type as well as the squamous, the question of superimposed inflammation must be considered. When we get into this field many clinical pictures result. Ulcerative changes may as well be due to infection as growth extension. It is no uncommon history to obtain of a sudden and recent change in a hitherto resistant tumor and when they appear for treatment the condition seems hopeless.

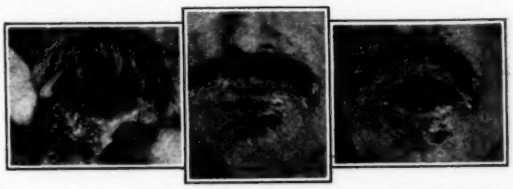

Fig. 3. The typical epithelioma of the lip, removed after gland dissection by keen excision and mobilization of flaps, not only of skin but of mucous membrane from the cheek, everted to construct the lower lip. In this case less than one-half inch of the former lip is present now, showing the possibilities of wide removal of the growth and yet making a satisfactory reconstruction.

It must also be remembered that the same tumor may appear differently in the several locations. The study of the original growth from the history occurrence, extension and present involvement is of course necessary. But it does not compare in importance to the study of the glandular system. Whenever glands are involved or become involved there is no assurance of a cure from any form of treatment and our efforts are so often palliative. A cancer death usually occurs some time. In one case it followed as long as seven years after inguinal adenitis following carcinoma of the genitals. No mammary carcinoma with supraclavicular involvement has lived over a year. No case of neck involvement where more than one gland was affected but what has eventually died from the disease. So far, I have been an advocate of gland dissection before any form of treatment is undertaken in the squamous type. In carcinoma of the cervix the anatomical area involved renders the procedure too formidable with no certainty of accomplishment. In the records of Dr. MacLaren and myself the only cases of carcinoma of the cervix cured were treated by vaginal hysterectomy, which means that the growth was local. In the inguinal, axil-

lary and cervical areas the only way to find out is by dissection. When we study the glandular system we are lost in a maze of anatomy and any attempt to remove all glands draining an infected area appears futile. But in the neck there are glands which may be considered sentinels. There are five: the top of the carotid chain on either side, the two sub-maxillaries, and the first or more often the second of the sub-mental. If these are free then there is a fair presumption that the original

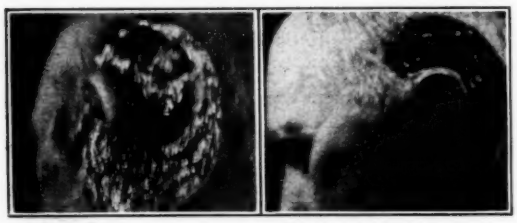

Fig. 4. A basal celled carcinoma representing cautery excision with delayed but early repair. After excision, the wound is Dakinized and so soon as clean granulations appear the area is covered by the use of the small deep graft of Davis. This graft is not a pinch graft but a good deep button of skin. This graft seems to take under all circumstances.

growth is local and justifies extreme measures. But if involved then there is no assurance of a cure from any form of treatment and surgical attack is often debatable. If all mammary carcinoma with palpable axillary glands were excluded, then surgery would be little used. But we are now beginning to see cases so early as to find single glands instead of the old fixed bunch and an occasional case in which no glands are found at all. In the neck and axilla, the justification of dissection of palpable glands is that frequently these are found inflammatory. The study of the glands in squamous carcinoma is equally if not more important than the study of the original growth.

CAN IT BE REMOVED?

All growths upon the face, head and neck, the breast, genitals, scars upon the body can be removed. The surgical treatment is only limited by the invasion of underlying tissues involving essential structures. Within the mouth there are several handicaps: (1) the difficulty of approach; (2) location in relation to bone; (3) the coarseness of our instruments. Marginal carcinoma of the tongue can readily be removed either by the cut and sew technic or by the cautery knife without blood loss. The mucous membrane of the cheek and lips can also be widely excised. Carcinoma of the floor of the mouth, carcinoma involving the alveolar process either upper or lower, posterior to the heel of the process, the tonsil area, and those involving the antrum, are most uncertain and in these areas attempt at excision is often abortive and destruction in situ is only possible. The use of the cautery knife near a bone causes a penalty of a sequestrum separating in from four to six months. The use of the cautery makes a coarse procedure and many times would shame a blacksmith. It does overcome many of the objections to keen excision, carries with its use hemostasis but our irons and electric cautery are so clumsy that they detract from certain work. The instrument of dehydration elaborated by Wyeth has a great appeal, as it meets many requirements and by its structure permits of more artistic and exact surgery.

CAN AN ACCEPTABLE REPAIR BE MADE?

In the field of external malignancy, there is the greatest opportunity for the selection of the various reparative measures and these are just as important from a cosmetic viewpoint as are the restoration of function in internal carcinoma.

The principles of tissue transference are known to every one but important observations have been made in the past few years, details which have augmented the use of skin grafts and flaps to a point where failure comes as a surprise.

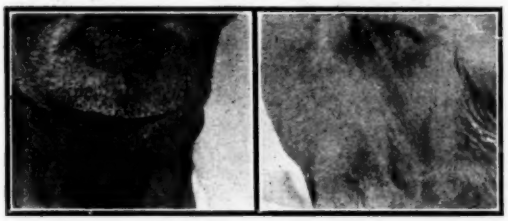

Fig. 5. A gross squamous celled carcinoma, which was removed by cautery excision. The defect was repaired by the use of a pedicle flap from the neck which can be seen in place over three years after the removal of a large tumor.

The resurrection of the full thickness skin graft; the possibilities of the small deep graft; the popular large thin graft; the selection of transference of tissue in group using the flap; the jump, the tubular, the delayed flap; the proof that skin will assume function of mucous membrane; the delayed flap on the palate; the wonderful development of prosthetic features, where noses and ears may be made in moulds with startling results; the splendid efforts in reconstructive dentistry; all indicate that

we must inject into the surgery of external malignancy, not only the effort at a cure but the principles and procedures of constructive surgery.

In the individual case the question of repair is divided between two possible plans: (1) keen excision and immediate repair; (2) cautery excision or destruction and delayed repair, which in turn is subdivided into early and remote. To elaborate

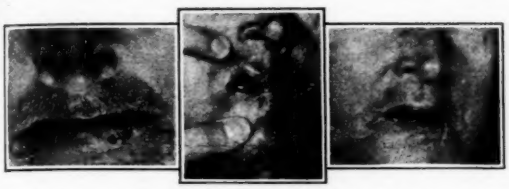

Fig. 6. An example of cautery excision and remotely delayed repair. A large squamous carcinoma on the inside of the left cheek with leucoplakia surrounding it and extending on to the lips. Wherever carcinoma appeared the skin was removed also by means of the cautery knife. Flaps remaining were used to close the wound and the patient was given one-half of a mouth, which he carried for one year. At that time no signs of a return were present, so his mouth was reconstructed.

plans in solving these questions is not now possible because each case must be considered alone. But I can see cases grouping themselves, along pathological lines and selective reconstructive steps. We as clinicians are more interested in the cure and its methods while so often the patient is more concerned with possible scar or loss of function.

Through the work and teachings of Davis, Blair, New, Keller, Ivy and many others all these details are in the literature for the use of anyone. And it is our duty to the patient to not only discuss methods of destruction but methods of construction. I believe that all our educational plans shall be directed towards the patient with a local growth, that all our efforts in diagnosis be directed to proving or disproving a local growth, and, proving the growth local, the possibility of surgical removal and reconstruction is the primary object.

The very wonderful effect of the agents of irradiation is in many cases startling, but the fond hope of their universal cure is not as yet proven. The discussion of a cure is not upon their relative merits, is not to be undertaken in a competitive spirit because we are grateful for them, not only radium and *x*-ray but chemicals and electricity. They all have their use and our earnest effort is to locate them in sequence and combination with surgery. But if we are seeking an unqualified cure then I believe the answer is a local growth widely removed.

THE RELATIVE VALUES OF SURGERY AND RADIOTHERAPY*

WILLIAM J. MAYO, M.D.
Rochester, Minnesota

In the preparation of this paper I have been fortunate in having an opportunity to discuss its various phases with my colleagues, Dr. Desjardins and Dr. Bowing. If I may be permitted to insert a conclusion into the opening paragraph, I will say that surgery and radiotherapy are both highly developed specialties which must be used with close co-operation if the best results for the patient suffering from cancer are to be attained, and, after all, this is the important consideration.

For the proper evaluation of the present position of radiotherapy in the treatment of malignant disease, one must take into consideration the results of the modern operation for cancer. Statistics must be sufficiently recent to insure the application of the newer operative methods, and yet sufficient time, from three to five years, must have elapsed since operation to permit the estimation of the percentage of cures.

Cancer consists wholly of the parasitic cancer cell. The stroma represents nature's defense. Nature treats this malignant cell like a foreign body, throwing out a stroma around it, which contracts and cuts off the blood supply. This no doubt often results in complete obliteration of the cell. Postmortem examination of persons who have died from metastatic disease in the lungs, for instance, will not only reveal large areas of cancer, but also extremely small areas. Scattered through the lung tissue are sometimes to be found little nodes of connective tissue which do not enclose living cancer cells, and yet one must conclude that they originally contained cancer cells which later became obliterated. Irradiation not only destroys the colloids of the embryonic cell, but also develops such masses of connective tissue as will, no doubt, eventually destroy some or possibly all of the cells, that were not killed by the rays. Truth is stranger than fiction.

In operating on patients who have been irradiated, one is impressed by the enormous amount of contracting scar tissue which can scarcely be cut, and yet, usually at some point in this tissue, per-

*Read before the annual meeting of the Minnesota State Medical Association, St. Cloud, October 9, 1924.

haps along the unobliterated blood vessels, there will be malignant cells that have been able to maintain their nutrition, owing to the fact that the flowing of the blood in the vessels acts both as a nutrient mechanism, and as a means of interfering with the action of the rays. The struggle, on the one hand, of the defensive scar tissue to encapsulate and obliterate, and, on the other hand, of the offensive cancer cell to survive by intense biologic activity, continues for a considerable time. The result in a given case is problematic.

Relatively, radiotherapy makes a better showing than surgery for a short period, because the knife has no such tendency to cause the development of scar tissue. If the growth recurs, it will probably recur much sooner following operation, other things being equal, than following irradiation.

Modern operative procedures not only remove diseased tissue, but also the paths by which malignant cells reach locations beyond the primary focus. Operation removes, in a block, the lymph nodes adjacent to the growth. Admitting that radiotherapy often affects secondary cancer of the lymph nodes favorably, by destroying the immature cells that cause the growth, and by initiating the development of connective tissue which contracts and cuts off the circulation, it is by no means as reliable as surgery, and, at least so far as I have been able to determine, the method of application employed in the past seldom cures.

Only particles of molecular size, such as sugar, the amino-acids, and other crystalloids, are absorbed directly through the vascular capillaries of the body. Colloids and large particles are picked up by the lymphatics. Bacteria and malignant cells, therefore, do not pass directly into the capillaries, but are carried by phagocytes into the lymphatics, which are a closed system of vessels. This process of phagocytosis is carried on by the widespread cells of the reticulo-endothelial system.

When the lymphatics are not involved, the percentage of surgical cures, as shown by a study of our cases, is more than 72 per cent for five years, but when they are involved, there are only 19+ per cent of cures. These percentages, however, are averages; the percentage of cures in cases in which only a few lymphatics are involved is very high, as contrasted with that in cases in which all the tributary lymphatic glands are involved.

This question of the involvement of the lymphatics has another angle. In certain organs, such as the large intestine, the lymphatic glands are usually enlarged, even in the early stages of cancer, and yet this enlargement may not be malignant. Many times in operating on cancer of the large intestine for which a colostomy had been made elsewhere, radical operation having been refused because of enlarged glands, microscopic examination of the glands has revealed the fact that the enlargement was due to sepsis.

Wilson, twenty years ago, introduced the method of the instantaneous staining of frozen sections by polychrome methyl blue, a method which has been one of the most important contributions to the microscopic study of living pathology.

MacCarty points out that the greater the amount of nuclear material in proportion to the cytoplasm of the cell, the greater its growing power, and that if the cytoplasm does not differentiate properly, growth without function results; in other words, malignancy is established by the tremendous oxidizing power of the nuclei which deprives the normal cells of their nourishment.

Broders has demonstrated that the greater the differentiation of the cell, the lower is the degree of malignancy. Based on this fact, in a study of 1,628 cases of squamous-cell cancer, he established an index of malignancy. The cases studied were divided, according to the degree of cellular differentiation, into four groups of different grades: Cancers in which about 75 per cent of the cells were differentiated and 25 per cent were embryonic, or undifferentiated (Grade 1); cancers in which the percentage of nearly normal cells and embryonic cells was about equal (Grade 2); cancers in which about 25 per cent of the cells showed evidence of differentiation, and about 75 per cent no differentiation (Grade 3); and cancers in which the microscopic sections showed no evidence of differentiation (Grade 4). The ultimate results in each case following operation were then investigated, and it was found that in the first group good results were obtained in 92 per cent; in the second group, in 62 per cent; in the third group, in 25 per cent, and in the fourth group, in only 10 per cent. Broders confirmed these findings by applying this index of malignancy to a larger series of cases.

Evans, in 1919, studied the pathologic conditions in 4,000 cases of uterine myoma in the Clinic, to determine the percentage of those undergoing sarcomatous change, and demonstrated that the per-

centage of mitotic figures in cells of the malignant connective tissue group gave a reliable index of the malignancy.

Bowing has shown, by sections from cancerous areas removed before and after irradiation, that a change often occurs in the cell structure after irradiation, the embryonic undifferentiated cells showing a tendency to differentiate and mature. These observations of MacCarty, Broders, Evans and Bowing confirm pathologically a fact that has long been known clinically: that cancer varies greatly in malignancy, and that its curability depends on the malignancy as well as on the situation and the stage of development of the growth.

A surgical operation, properly conducted, in well selected cases has a tremendous advantage over radiotherapy, chiefly in the exactness with which the diagnosis can be made and the limitations of the growth approximately defined. The surgeon no longer works by the unaided senses, but by sight aided by the microscope. The condition in doubtful fields is quickly and accurately determined within three minutes, by the examination of frozen sections. Not only can the malignancy of the growth be established, but also the grade of the malignancy. In the presence of a large percentage of differentiated cells, surgical operation is not only justifiable, but imperative. It is obvious, therefore, that the results of operation depend not only on the possibility of removing the local evidence of the disease, the lymphatic pathways, and the regional lymph nodes along which progress away from the locality could be expected, but also on cellular activity. When the cells are highly undifferentiated, operation, because of the immediate danger and small prospect of cure, may not be as rational as radiotherapy. It is in the cases of highly undifferentiated cellular growths, Grades 3 and 4 in Broders' index of malignancy, in which surgery offers but a small prospect of cure, that radiotherapy has its remarkable value.

I have witnessed the rapid disappearance, under radiotherapy, of enormous cellular tumors in the abdomen for instance, secondary to malignant teratomas of the testes. Experience has taught that the surgical removal of these secondary growths is fraught with danger, and is generally futile, but several of our patients with such growths have apparently been cured by radiotherapy for three years, and in one case for more than five years.

It will be seen, therefore, that surgery and radiotherapy, in a way, are complements of each other. Surgery, however, has a wider application since it can be applied with accuracy to the large group of cases of cancer of the gastro-intestinal tract, and other internal regions in which radiotherapy is at best seldom curative. The attempt to treat deep-seated internal cancer by irradiation is difficult and uncertain; it is justified only when incurability of the lesion by the knife has been demonstrated.

Radium has had its greatest triumph in the treatment of cancer of the cervix uteri. In the favorable case, radium is not only a compeer of the knife, but in the advanced case, when the vaginal fornix or the broad ligament is involved, it is the treatment of choice. The rays affect the embryonic cell with special vigor, while the sound tissues, such as the ureters, are little affected. On the contrary, in cancer of the body of the uterus, taking good, bad, and indifferent cases, surgery cures from 70 to 80 per cent, and radium and *x*-rays produce poor results. It has been a common experience in the Clinic, that even after radium had been used by experienced men in the body of the cancerous uterus for prolonged periods, it was eventually necessary to remove the uterus, because some part of it still contained malignant disease. Bowing has shown that certain patients, however, in whom, by reason of age, extensive cardiovascular lesions, obesity, and so forth, the risk of a total abdominal hysterectomy is great, may be benefited and possibly cured by irradiation following curettement. In early external cancers, while the growth is still strictly localized, radium will give results comparable to those obtained with the knife. From the cosmetic standpoint, there is much to commend the use of radium in certain situations, especially about the eyelids, where scar-tissue contractures are so troublesome.

Clark, in a recent article, voices my own experience that radiotherapy is effective almost immediately, if at all. The proper application of radium to cancer of the cervix, for instance, probably will accomplish all that can be accomplished. For fear that it may not have been accurately applied, further treatment may be given in certain cases, but rarely a third. When one sees the great number of persons with cancer undergoing repeated treatments with radium and *x*-ray, paying in advance for the very slight prospect of benefit other than psychic, one feels like uttering a protest. The pa-

tient should have the benefit of any doubt, but when radiotherapy is used as the quacks use it, valuable therapeutic aids are brought into disrepute.

The most difficult aspect of my subject concerns the combined use of surgery and radiotherapy. Combination of surgical and radiotherapeutic methods, unless to meet definite indication, has been disappointing. In twelve cases of cancer of the stomach, after finding the condition inoperable, I made a gastrostomy and introduced a tube into the malignant end of the stomach in order to bring radium to bear effectively on the disease. None of the patients was alive at the end of a year. In other instances, I have made colostomies just above a malignant growth of the colon in order to bring radium down into the lumen, the radium being guided into exact position with the finger. Several of the patients were greatly benefited, but none cured. I do not say this to disparage radiotherapy, because these cases were advanced and beyond the possibility of being benefited by surgery; perhaps the treatment was inadequately applied, since possibly all portions of the tumor were not reached; but had the results been better, one's faith in the general application of irradiation would have been greatly strengthened.

It is interesting to trace the cases in which we have removed the greater part of the lesion surgically and then, because malignant tissue definitely or possibly remained, applied radiotherapy. Generally speaking, the results have been disappointing. In the cases in which I knew help was needed, cure was not effected, and in the cases in which I hoped that I had removed all the diseased tissue, there was no way to tell whether the attempt to insure cure by radiotherapy had been of value.

Among certain surgeons of great ability there has been a belief that in many, if not all, surgical cases of this description, irradiation before and after operation is beneficial. When one sees large cancers in the chest wall, which have metastasized from the breast, respond marvelously to *x*-rays or radium, the advisability suggests itself of giving every patient the possible advantage of such treatment, although cure is not to be expected. Desjardins calls attention to the danger of surgical invasion into certain cancerous fields, which have been greatly benefited but not cured by *x*-ray therapy, because of the risk of initiating a rapid extension of the disease. In this connection, Bowing also points out the necessity for caution in deciding to operate on growths primarily inoperable, which have been greatly benefited by radium, because of the danger of opening up new channels of infection.

Unfortunately, the question of the curability of cancer is too often academic, because of the very large number of incurable cases that reach the surgeon, in which palliation is the utmost he can achieve. Here radiotherapy is, at its best, a triumph and a despair. It often does so much good that the patient and family begin to look for and expect cure, but death, not cure, comes eventually, and radiotherapy is unjustly brought into disrepute after a meritorious performance.

An unpleasant part of this discussion concerns the persons who are to use radium and *x*-ray for the cure of cancer. When this work is done by men of wide experience, associated with an experienced surgeon and a competent pathologist, radiotherapy has great value. Today a large number of men with a small amount of radium, or with an *x*-ray machine, are treating operable cancers. As I heard a surgeon say, "With a nickel's worth of radium, a million dollars' worth of harm can be done." The use of radium and *x*-ray for therapeutic purposes is as much a specialty as surgery, but in the hands of the inexperienced, or of those who depend on the clinical diagnosis of the disease, it becomes a menace.

Electrothermic methods are proving to be valuable therapeutic adjuncts, especially in the cases of superficial tumors in which the anatomic relations will not permit wide surgical removal, or in which intensive radiotherapy is contraindicated.

Surgery, *x*-ray, radium, and electrothermic methods will cure cancer, but the choice of method for a particular case should only be determined after serious consultation.

GLYEUTHYMENOL NOT ACCEPTED FOR N. N. R.

According to Nixon, Stuart and Barker, Glyeuthymenol is "a scientifically formulated combination of Eucalyptol, Thymol, Menthol, Sodium Benzoate and Zinc Sulphate with a Glycerin base." Glyeuthymenol is to be applied to the cervix by means of a special applicator and, according to the label, it is "indicated in leucorrhea and as a vaginal antiseptic and prophylactic." The advertising designates Glyeuthymenol as a "vaginal prophylactic" and stresses its use as a preventive of gonorrhea and as a contraceptive. The Council holds Glyeuthymenol an unscientific mixture that is sold with claims that are misleading and unwarranted and the use of which is inimical to the public health. *(Journal A. M. A., Nov. 15, 1924, p. 1606.)*

WHAT THE LAITY SHOULD KNOW ABOUT CANCER*

WM. A. O'BRIEN, M.D.
Minneapolis

The American Society for the Control of Cancer is an organization which was founded in May, 1913. Under the auspices of this body, lectures have been given all over the United States. The society offers suggestions for material to be presented in such talks and has issued numerous pamphlets for lay and professional readers. For several years Dr. E. T. Bell, Professor of Pathology at the University Medical School, and I have talked to various audiences on the subject of the cause and prevention of cancer.

A conservative program was outlined and an attempt made to present the material in such a way that the listeners carried away a definite idea of cancer. Lantern slides showing illustrations and striking facts have been very helpful. There are two phases which may be stressed: (1) various ideas regarding the cause, and (2) the means of early recognition. We consider the latter more important. Cancer causes one death out of every ten after the age of 40 years. About 90,000 persons die of cancer in the United States every year. The purpose of the national campaign has been to lower this death rate. The method of attack has been patterned after that used in the anti-tuberculosis work. The problems present some features in common, the chief one being that in early recognition lies the hope of cure.

In order to accomplish results comparable to those obtained in the anti-tuberculosis campaign the laity should be as well informed upon the early signs of cancer as they are upon those of tuberculosis. Very few people wait before consulting a physician when they have a chronic cough, loss of weight, or are spitting blood. Education has accomplished this.

Ninety per cent of cancer occurs after the age of thirty-five years. The establishment in people's minds of a definite time of life when cancer may occur is of value. It must not be lost sight of that cancer between the ages of twenty-five and thirty-five years is not unusual.

*Read before the annual meeting of the Minnesota State Medical Association, St. Cloud, October 9, 1924.

There is a deplorable tendency of some lecturers to overestimate the probability of cure of cancer. Such statements as "90 per cent of the cancer deaths which occur in any given community are preventable" are not based upon facts. A more conservative estimate of the situation places this figure at one-third, or approximately 30,000 lives which may be saved by early recognition and adequate treatment. Statistics indicate that 35,000 persons die of cancer of the stomach and liver every year and 26,500 of cancer of the peritoneum, intestines and other portions of the body, groups in which early recognition is very difficult, and in which cures even of early cases are rare.

The cause of cancer is always of interest to lay audiences. Contradictory impressions are gained from the daily press as to the exact status of this question. The following statements are probably true at the present time.

1. Cancer is not a germ disease. While it bears some points of similarity to chronic infection, no definite organism has been found to cause cancer.

2. It is not contagious. A great deal of misapprehension exists on this point. The care of infected tumors is the same as that for other infections.

3. It is not a constitutional disease. Much of the material which appears in various types of magazines relating to the cause of cancer deals with such vague subjects as dietary factors, failure to keep in good physical condition, etc.

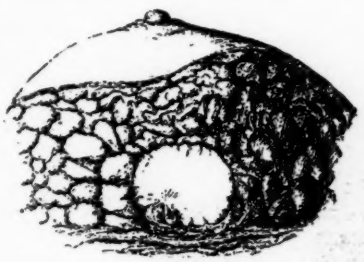

Fig. 1. A lump is the chief early sign of cancer of the breast.

4. Human cancer has not been proved hereditary. There is conclusive evidence to show that the tendency of white mice to develop spontaneous tumors is governed by the laws of heredity.[1] Similar data are wanting for man, although exceptional families where this is probably true have been

studied. Even those who strongly incline toward the hereditary factor do not consider this the fundamental cause of cancer but rather a predisposing influence.

5. Beginning cancer is a local disease.

6. Chronic irritation is a cause of certain varieties of cancer. Familiar examples are tumors developing in the mouth from irritation of ragged, carious teeth and badly fitting dental appliances. The production of keratoses from exposure to sunlight which later may become malignant[2] and the development of cancer in *x*-ray workers of an early day are also examples.[3]

It is hardly fair to say that we know nothing of the cause of cancer when experimental workers can produce it at will in mice by the application of tar.[4] The development of tar cancer following tar itch in workers in dye factories is not debatable.[5] The development of cancer of the scrotum in chimney sweeps has established soot as a chronic irritant. The tobacco quid held at one place in the mouth over a long period of time is another familiar example.

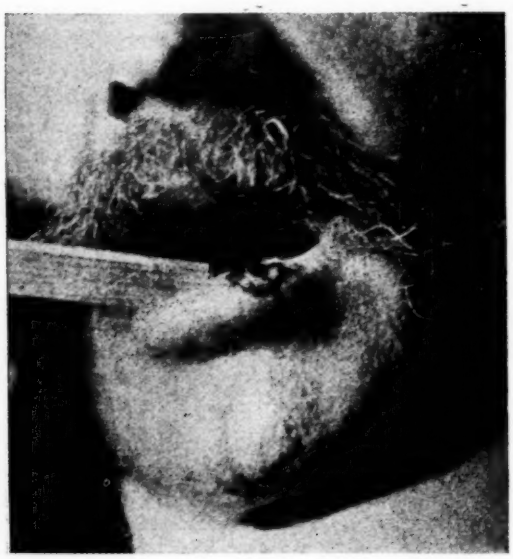

Fig. 2. The sore that does not heal may be cancer. Squamous cell carcinoma of the lower lip, early stage. Illustration from Ewing, Neoplastic Diseases, 1922.

Instruction of lay persons as to the early signs of cancer should be simple. We have reduced this instruction to a few formulæ. Cancer always begins as a single small lump or sore. Examples of the lump are common but the breast is the most important (Fig. 1). Most of the lumps for which women consult physicians are not cancer. Many patients do not come until the lump has been present for some time, although they have just discovered it. Periodic physical examination or the examination of the breasts on the first day of the menstrual period (by the patient) are suggestions

Fig. 3. Sores upon the inside of the body that will not heal may be cancer. They give evidence of their presence by bleeding. Squamous cell carcinoma of the cervix. Illustration from Crossen, Diseases of Women, 1922.

of value. A lump in any other part of the body may be cancer. A sore that does not heal may be cancer (Fig. 2). The usual locations are the lower lip, face and hands. About 90 per cent of cancer of the skin occurs above the collar. The limit of thirty days may be placed upon the failure of a sore to heal before coming in for special attention. We tell lay audiences that the only sure means of finding out whether a lump or sore is cancerous is by removal and examination.

Just as sores upon the outside of the body that will not heal may be cancer, so sores upon the

inside of the body that will not heal may be cancer. The latter give evidence of their presence by bleeding, so that unusual bleeding from the uterus in women (Fig. 3) or from the bowel or bladder in either sex should arouse suspicion.

Cancer is rare in a clean mouth. The treatment of precancerous lesions of the mouth is the most important preventive measure that can be used.

Most audiences are confused by the advice usually given regarding moles. Most people have moles but the number of moles that become malignant is very small. Removal of all moles as precancerous lesions is a doubtful measure. Only moles subjected to chronic irritation should be removed. The use of the electric needle should be condemned and only wide excision or destruction by radium advised.

The early signs of cancer of the stomach are not well known. Many patients with this disease do not know of its presence until too late. Persistent indigestion developing in middle life in persons who have never had gastric distress may be due to cancer. There are several other causes of the same complaint, so that the advice given cannot be very specific.

We do not recommend any special form of treatment. We attempt to convey the idea that the only efficient means of eradicating a local growth is by removal or destruction. The use of pastes is condemned. There is no known medicine which will cure cancer. Illustrative slides from the Department of Agriculture, showing analyses of various cancer fake remedies, have been used.

We believe that the most important phase of cancer education for lay persons is to teach them the early signs of cancer so that they may come to the physician when the disease is still in a curable stage.

REFERENCES

1. Slye, Maud: Jour. Cancer Research, 7:107, 1922.
2. Councilman and McGrath: Jour. Med. Research, 21:331, 1909.
3. Porter, C. A.: Jour. Med. Research, 21:357, 1909.
4. Yamagiva and Ichikawa: Jour. Cancer Research, 3:1, 1918.
5. Schamberg, J. F.: Jour. Cutaneous Diseases, 28:644, 1910.

A REPORT OF ONE HUNDRED CASES OF AMEBIASIS OBSERVED AT U. S. VETERANS' HOSPITAL NO. 65*

THOMAS D. TUTTLE, M.D.
St. Paul

In presenting this subject for your consideration, I have nothing new or startling to offer, either in the matter of diagnosis or treatment, but wish to invite your attention to what appears to me to be a rather common disease in this district at this time, especially among ex-service men, and to raise the question as to whether the existing prevalence is a post-bellum invasion or whether it prevailed with equal frequency prior to the World War.

That the disease is comparatively common among young men, born and raised in this district, who took part in the recent war, especially among those who were overseas, is demonstrated by the fact that out of less than one thousand cases admitted to the general medical ward in Aberdeen Hospital over a period of twenty months, one hundred were found to have amebiasis. In each of these cases the *Entameba histolytica* was demonstrated in the stools on repeated examinations.

When it became apparent that we were finding so many cases in which the disease had been overlooked in other service hospitals, in private hospitals and by private physicians, I began to wonder if we were not "seeing things" and, therefore, proceeded to check our laboratory findings in every way possible. This check has been so complete and persisted in so long that I think I am safe in assuming that our laboratory technician is not making a mistake, but is finding the ameba, and her findings are supported by the results secured in treating these cases for amebiasis.

Repeated examinations of feces from the same patient have in several instances, revealed both the *Entameba coli* and the *Entameba histolytica.* The finding of motile ameba indicates that a parasite is being observed rather than a phagocytic cell. Motile ameba containing red blood cells have been classified as *Entameba histolytica,* and those containing bacteria as *Entameba coli.* Another distinguishing feature is the appearance of the pseudopode, *Entameba histolytica,* putting forth clear ecto-

*Presented before the Annual Meeting of the Minnesota State Medical Association, St. Cloud, October, 1924, with the approval of U. S. Veterans' Bureau.

plasm, while the *Entameba coli* projects ecto- and endoplasm. The recognition of the cystic stage is a more difficult matter. We are using the iron-hematoxyline stain in differentiation of the encysted forms. In the study of these cases we have had the opportunity of observing repeatedly both the encysted and motile stages in the same individual. This series of cases embodies only those in which motile ameba bearing red blood cells were found.

I have only hinted at the laboratory technique, as there is an abundance of literature on the subject written by more competent hands.

In a number of our cases both the *Entameba histolytica* and the *Entameba coli* were found. In a surprisingly large number of cases the *chilomastix* are found in conjunction with the ameba and these persist long after the amebæ have disappeared from the stools. So far as I have seen in the literature the *chilomastix* is not considered a serious infection, but from my observation of these cases I am convinced that this parasite is not a welcome visitor in the human intestinal canal. So far, all that I can say is that it is found alone most frequently in those cases that show alternating attacks of constipation and diarrhea.

In the face of finding more than 10 per cent of the cases admitted to one ward to be suffering from amebiasis, I invite your attention to the various diagnoses under which these cases were sent to the hospital, especially to the fact that only nine of them were even suspected of having amebiasis, and of these nine three were diagnosed at the Mayo Clinic and four sent here from Kentucky. I also invite your attention to the fact that, almost without exception, these cases had all been treated in other service hospitals, in private hospitals and by family physicians, but in only nine of the one hundred was amebiasis even suspected. It is evident then that the disease is frequently being overlooked in the ex-service men and the question is "Is it not being overlooked with equal frequency in other classes?" and "If overlooked now was it overlooked with equal frequency five or ten years ago?" (During the last four or five months, and since the data for this paper were collected, a number of cases have been sent to the hospital under a diagnosis of amebiasis.)

That the finding of amebiasis in this district at this time, whereas it was not found five or ten years ago, is not something peculiar to this locality, is demonstrated by a report of thirty-one cases in Seattle, Washington, by Dr. George E. Dowling.* So far as I know, this is the first report of amebiasis in Washington State. Did it exist before and is it just now being recognized or is it something new? It is interesting to note that Dr. Dowling raises the question of the influence of an increased Oriental population in Washington on the prevalence of this disease. At the same time we note that, in discussing Dr. Dowling's paper, Dr. Harold W. Wright, of San Francisco, says: "During the past year I have analyzed twenty-five cases of this infection. Every one of these cases were referred to me because they were nervous, and were considered to be neurasthenics. There were some neurotic disturbances. The average duration of symptoms before the final diagnosis was three and a half years. Some of these men seemed to have contracted the infection in Camp Lewis, and the rest in France and in the Philippines."

Surely the oriental problem is as great in California as it is in Washington, and yet Dr. Wright places the responsibility of infection squarely on their military service without question of the local oriental population. I am inclined to agree with Dr. Wright in regard to the ex-service man, but at the same time I believe there is strong presumptive evidence that the disease has existed in a mild form in this and other localities for a long time and that it is just now beginning to be recognized. In regard to the ex-service men, the class of cases that come under my observation, it is not reasonable to assume that they would have gone to the age of twenty or thirty years without presenting any symptoms had they been infected with amebiasis before entering military service. But these men have been back from the front five years. If amebiasis is communicable (and I think that is granted) then how much longer must you wait before you expect to find infection among their sisters, brothers, cousins and aunts?

In Hygienic Laboratory Bulletin Number 133 of the U. S. Publlc Health Service is set forth the result of an attempt by correspondence to determine whether there has been an increase in amebiasis following the war. Out of 440 hospitals heard from only fifteen reported an increase in amebiasis. Out of fifty-nine medical schools heard from only ten reported an increase. This result serves only to confirm my contention, namely: the disease is not being recognized. I am firmly of the

*Jour. Am. Med. Assn., November 17, 1923, p. 1657.

opinion that if a systematic examination of stools is made in all cases the *Entameba histolytica* will be found in a surprisingly large percentage of the cases.

Kofoid and Swezy (New Orleans Medical and Surgical Journal, July, 1920) report the finding of the *Entameba dysenterice* (histolytica) in sixty-one, or sixty-seven per cent, of ninety-one students examined at the University of California. These were all discharged soldiers that had been overseas. Out of thirty-four discharged soldiers who had not been overseas only nine, or twenty-six and one-half per cent, were found to be infected.

With such findings by men of unquestioned ability among men who are apparently sound, at least not presenting any subjective symptoms, is it not reasonable to expect that we will, with care, find a like number of infections among men who are presenting a series of symptoms that cannot otherwise be accounted for? In the face of Kofoid's findings it would seem that I am overlooking about four out of five, rather than finding too many.

DIAGNOSIS

The ultimate diagnosis in these cases depends on the accuracy of your laboratory work. However, it must be remembered that the technician comes into the case only on invitation of the practitioner, and your laboratory findings will depend, to a large extent, on the condition of the specimen submitted for examination.

As stated, I have nothing new to offer in regard to methods of diagnosis, but there are a few points that appeal to me so strongly that I venture to bring them to your attention. The first is in the taking of the case history. We all preach the importance of letting the patient tell his own story in his own way, but how many of us actually practice that teaching? I recently listened to a history that, in part, ran as follows: Doctor—"Now tell me what sickness you had while in service." Patient—"About the last of August, 1918, while on the Argonne Front, I had a severe attack of diarrhea." Doctor—"Oh—everybody had diarrhea over there." Thus checked, or, as he thought, reprimanded, the patient did not mention his bowels again until asked, "How are your bowels?" to which he replied, "Sometimes loose, sometimes constipated," and the history read "bowels irregular." It later developed that this patient's chief complaint was alternating attacks of diarrhea and constipation, due to a severe infection with the *Entameba histolytica.*

It seems to me that we have become so highly specialized that we are unable to take a careful history. The lung specialist hears only those symptoms that may emanate from pathology of the respiratory tract; the neurologist only such as may indicate a lesion in the nervous system or derangement of mental functions; the throat specialist seems to forget that the human anatomy extends below the hyoid bone; the surgeon heeds only such signs as point to the need of an operation; the gastro-enterologist seems to have a firm conviction that all disease has its start and finish between the hyoid bone and the cecum, and all forget that last (if not the chief) end of man, the colon and rectum.

If we could combine the histories taken by all the specialists we would have a fairly complete statement of the case. But this being impractical, and the old-fashioned doctor being obsolete, it would be a good idea to persuade the recent graduate to defer becoming a specialist until he can take a careful history. But this is impractical, because the intern learns to take a history to confirm the diagnosis under which the patient is sent to the hospital. There should be no preconceived diagnosis when a case history is taken.

It would seem presumptuous to say that it is useless to attempt to examine for active ameba a stool that has been allowed to become cool, and yet this seems to be frequently undertaken. I realize that there are experts who say they can find the ameba in cold stools as well as in warm. Unfortunately, very few of us are such experts. I am not a laboratory expert, but I do know that when warm stools are sent to the laboratory the chances of getting a positive report are far better than when a cold stool is sent. I may be over-particular in this matter, but I insist on the stools being examined immediately after passage, while still warm from body heat, and not some hours after, even though they may have been kept warm in a water-bath or otherwise. I do not find it necessary to starve a patient before taking a stool, but I do insist on their taking salts before breakfast and the second stool being sent to the laboratory and immediately examined. Not infrequently the amebæ will not be found until the patient has taken salts for two or three days. When patients are suffering from diarrhea with mucus in the stools the ameba may frequently be found without giving a laxative. A negative report

on a single stool is no more conclusive than a negative report on a single specimen of sputum.

Examination of the lower six or eight inches of the bowel rarely shows any evidence of disease, other than a general congestion that would be expected in any case of colitis. With a long Kelly tube or, as I prefer, a pneumatic sigmoidoscope, we are frequently able to demonstrate ulcers in the sigmoid. In the early stages these ulcers present a mother-of-pearl appearance, but later, when infected with micro-organisms, they present no characteristic appearance. In many cases the ulceration, if present, is too high in the colon to be seen.

The subjective symptoms complained of present the widest range you can imagine, pointing all the way from psychosis to lumbago; and yet if you let the patient tell his own story without "helping him" he will almost always give a history of chronic diarrhea, not infrequently alternating with constipation. I have said these cases will "almost always" give a history of chronic diarrhea, but, contradictory as it may seem, cases with severe infection with amebiasis will sometimes give a history of persistent constipation. Sometimes they will give you as clear a history of ulcer of the stomach as you would care to listen to, but the *x*-ray will be negative, the stomach content may show hyper- or hypoacidity, but the stools will show ameba and the stomach symptoms will subside with the treatment for amebiasis. Of course the patient may have both a peptic ulcer and amebiasis. I have three such cases under my care at present. I have also had two cases that I treated for peptic ulcer but they did not improve under treatment. Later amebæ were found in the stools and the gastric symptoms subsided under treatment for amebiasis. I had simply made a mistake in my diagnosis of peptic ulcer.

As an illustration of the wide range the symptoms will take I will cite the diagnoses with which a patient was recently admitted to the hospital: "Psychosis, hysteria; constipation; cholecystitis; appendicitis, chronic, mild; tonsillitis, chronic." When I saw that admission sheet I thought "Sounds to me like amebiasis" and it was, the first stool showing numerous active amebæ containing from four to eight red blood cells.

Of the one hundred cases included in this report eighty-nine were born and raised in the tenth district, comprising the states of Minnesota, North and South Dakota and Montana. Of the remaining eleven two were raised in Illinois, one in Wisconsin, one in Iowa, one in Texas, one in Indiana, one in Ohio, two in Kentucky and two were foreign born.

The source of infection, as nearly as I can estimate from the histories, was: Philippine Islands, eight; Cuba, two; France, chiefly in the Argonne district, sixty-nine; Kentucky, two; on the Mexican border, two; undetermined, seventeen.

The chief diagnoses under which these cases were sent to the hospital are as follows: Observation for a neuro-psychiatric condition, twenty-two; observation for pulmonary tuberculosis, nineteen; observation for gastric ulcer, twenty-nine; observation for cardiac disease, two; observation for tape worm, one; treatment of diarrhea, seventeen; observation for amebiasis, nine. Many of these cases had been in this and other hospitals for "observation for" various other conditions before coming under my observation for conditions given above. Three cases have developed abscess of the liver, one before and two after coming to the hospital.

I shall recite the histories of only a very few of these cases, selecting examples of the various types, as they appeal to me.

As illustrating that type of case not pointing to anything in particular, and especially not suggesting amebiasis:

I. N. E., aged 33, farmer, was admitted May 26, 1923, for observation of a chest and stomach condition. This patient had previously been admitted for observation for a neuropsychiatric condition and on another occasion for *x*-ray of the gastrointestinal tract and analysis of the stomach content. He was discharged from Camp McArthur, Texas, on account of hyperthyroidism. Since discharge he has suffered from repeated attacks of vertigo and vomiting, coming on about every ten days or two weeks. He has lost about ten pounds in weight. He has frequent headache, is very nervous and irritable and seems worried. Complains of feeling weak. Bowels are constipated. Examination of lungs negative. *X*-ray of chest and gastrointestinal tract negative. Basal metabolism plus 31.62. Examination of abdomen gave only slight tenderness along line of descending colon. Examination of feces June 1, 1923, showed active *Entameba histolytica*. This patient was treated for amebiasis. He gained weight, headache stopped, nervousness and irritability subsided and in every way he made excellent improvement. On October 10, 1923, basal metabolism was plus 4.16. Ameba continued in stools up to the middle of January, 1924, after which none were found. He was discharged in April of this year and is now in training. There was nothing in the history of this case to suggest amebiasis, and it serves to demonstrate the importance of systematic examination of stools.

As an example of the "gastric ulcer type" I cite the following:

E. G. G., aged 31, native of Illinois and farmer, was admitted April 30, 1923, for observation for gastric ulcer. In December, 1918, patient had bronchitis and was in the hospital about two months. After leaving the hospital he began having pain in epigastric region. Pains are more severe and persistent during the winter than during the summer months. Pain starts an hour or so after eating. Has eructation of gas and sour matter. Taking food does not relieve pain to any extent. Was treated in ——— hospital from November, 1922, to March, 1923, for gastric ulcer. Has been some better since, but continues to have pain in abdomen and is very nervous. In January, 1922, appendectomy was performed. At present he complains of nervousness and attacks of cramp-like pains in lower part of abdomen, which attacks are followed by diarrhea for two or three days, after which he will be free from pain until he "eats something that upsets his stomach" and causes him to have another attack of pain and diarrhea. He has not been able to find what kind of food it is that causes the attacks, for it "seems to be most anything." Bowels are constipated except during attacks of diarrhea. Physical examination is negative. *X*-ray of the gastrointestinal tract is negative. Stomach content after a test meal shows a total acidity of sixty-two degrees. Examination of feces May 4, 1923, showed active *Entamebæ histolytica.*

As a sample of the tuberculosis type:

E. B. G., student, aged 27, and a native of Minnesota, was admitted May 31, 1923, for observation for pulmonary tuberculosis. In December, 1918, he was sent to a hospital in Metz on account of diarrhea. After transference to several other hospitals he was finally returned to the States, where he was discharged under a diagnosis of tuberculosis of the intestines. Since discharge he has had frequent attacks of diarrhea. He has cough with expectoration, is weak and easily exhausted. Is very nervous and irritable. Is unable to continue training on account of weakness, nervousness and shortness of breath. Physical examination shows a man somewhat under weight, very nervous and restless. Examination of lungs shows chronic pulmonary tuberculosis, moderately advanced, inactive. Heart is negative. On June 30, 1923, examination of feces showed active *Entamebæ histolytica.* This claimant's general condition improved greatly under treatment for amebiasis and he is now in training and has not, as yet, shown any return of symptoms. Monthly examination of stools occasionally shows encysted ameba, but no active parasites.

As showing the neuro-psychiatric type:

H. E. E., aged 29, farmer and native of Minnesota, was admitted August 19, 1923, for observation of the lungs. In October, 1918, while on the Argonne Front, he was in hospital six weeks on account of diarrhea. In December, 1918, he had influenza and since then he has had bronchitis every winter. Since leaving the service he has had frequent attacks of diarrhea alternating with constipation. He was in a hospital for nervous diseases for six months in 1921. In July, 1922, he was in ——— hospital on account of tonsillitis. He complains of cramp-like pains in lower part of abdomen with diarrhea, burning of skin ("skin fever"), especially of the face and scalp, headache, nervousness and insomnia. On August 23rd, examination of feces showed active *Entamebæ histolytica.* Under treatment for amebiasis this patient changed from a complaining, whining, discontented individual, going about with his head in his hands and saying he "was burning up," to a bright, happy fellow. He is now in training and shows no subjective symptoms, though encysted ameba are still present on occasional examinations.

As illustrating a history as viewed from different angles:

R. E. S., farmer, aged 25, native of Minnesota, was admitted to the neuropathic ward July 25, 1923, and transferred to general medical ward October 24, 1923. History as taken by the neuropsychiatrist: "Patient states he strained his shoulder and chest lifting a heavy gun in Pekin, China, September, 1918. This strain continued to bother him and he was hospitalized in November, 1918, at the American Legation Hospital, China. Since discharge—returned home and went to farming. Says he has only been able to work about one-half the time on account of headache, weakness and dizziness. Has not worked at all the past year. Has not been treated by any doctor since discharge. Has had about twelve fainting spells since fall of 1920. They last about five or six minutes. Fell off a tractor one day last fall while at work." History of the same case as taken by the internist: "In the spring of 1918 while in the Philippines he had a severe attack of diarrhea, lasting about three weeks. Had blood and mucus in stools. After the diarrhea stopped his bowels became constipated. For about two months, while in the Philippines, he had repeated attacks of diarrhea alternating with constipation and had constant headache and 'dopey' feeling. From the Philippines he went to China. Was there about seven months, during which time the alternating attacks of diarrhea with constipation and headaches with 'dopey' feeling continued. He was in hospital in China for about two weeks on account of strained shoulder. Since discharge—he has been able to do very little work on account of headache, nervousness, vertigo, despondency and attacks of diarrhea, coming on about every six weeks or two months and lasting one or two weeks. During the attacks of diarrhea he will become very weak. Has blood and mucus in stools when he has diarrhea. Has had several fainting spells during the last eight months. His nervous spells are more pronounced when his bowels are constipated."

This patient showed active *Entamebæ histolytica* and has made fairly good progress under treatment, but he still shows some symptoms though active ameba are no longer found in his stools. He has a high basal metabolism and his present symptoms may be due to a hyperthyroidism.

TREATMENT

So far as I have been able to learn, the only thing new in the treatment of amebiasis that has developed in the last decade—if new it can be called—is the return to the use of ipecac in one form or another. The discovery of emetin has made the

administration of ipecac easier. It seems to me that emetin by hypodermic will reach the ameba in the tissues, but by the time it reaches the intestinal tract it will be in such dilute form as to be of little or no avail. Therefore, if we can get the drug into the intestinal tract in a more concentrated solution it appears to me that we will get more prompt results. I am now using emetin bismuth iodide and am considerably encouraged with the results secured. It is, to say the least, not pleasant to take, and some cases cannot tolerate it at all. As to the use of coal oil or quinine enemata, I have found but little choice between the two, and sometimes I wonder if the results secured from either pays for the discomfort and inconvenience they cause the patient. Reports from the use of Chapparo Amargosa were very encouraging for a time. I must confess that I have been disappointed in the results I have secured from its use. When used as a high enema it seems to me that I get some influence on the diarrhea, but I fancy this is probably due to some astringent action of the drug rather than to any specific action. Alcresta Emetin, an emetinated fuller's earth, has given very little result in my hands. I fancy this is due to the fact that the compound is but slightly soluble in either alkaline or acid media. Recently salvarsan has been advocated in the treatment of amebiasis. I have used it in a number of cases and am encouraged from the results secured. In four cases in which I used salvarsan from the start I secured no benefit. In those cases which were pretty well saturated with emetin, but which continued to show amebæ, the use of salvarsan seemed to "help over the hump" as it were and apparently completed the work that emetin seemed not quite able to accomplish.

Recently, I had presented to me a paper on the treatment of amebiasis which gave me the impression that, according to its author, all you have to do to cure amebiasis is to give six grains of emetin by hypo in one grain doses daily and your patient is well "just like that." Not so with my cases. Some of them seem to come along fairly well, but in others the amebæ, like the Ford, just "ramble right along."

When your patient is ameba free, you are not through with him. He does not complain of the amebæ, but of the colitis and other symptoms probably due to absorption of amebic products. Until the amebæ are removed, or at least materially reduced, you can have little effect in the treatment of the colitis. But after the amebæ are removed you have a real man's job to treat the colitis and relieve the symptoms that have resulted from a prolonged infection. After he is apparently well and ten to twenty stools, taken at weekly intervals, show negative, he should be examined every two or three months to see if there is any reappearance of the infection. Not infrequently, when your patient is feeling quite well, you will experience a sinking sensation in your gastric region when your laboratory report reads "*E. histolytica* present."

It seems to me that this subject is one of deeper interest than merely academic. If the prevalence of amebiasis among the returned soldiers is as marked as would seem to be from the number of cases that have come under my observation, what is the probability of its becoming prevalent throughout your state unless precautions are taken? In other words, you have the public health problem to consider. If this disease is being overlooked in the returned soldier, as would seem to be the fact from the cases that I have observed, is it not only possible, but probable, that it is being overlooked with equal frequency among those who were not overseas? Certainly you are not giving the returned soldier the short end of the game when you attend him, and a great many of these boys have been under your care as well as under the care of doctors employed by the Government. The last case that came to my ward had been under the care of his family physician for "stomach trouble" ever since his return from the service. Finally, where did these boys get their infection? Are you absolutely sure that amebiasis did not exist in Minnesota ten years ago? Is this a new infection or an old infection just being recognized? The same question applies to Washington, to California, to Montana and the Dakotas. We are receiving cases from Montana and the Dakotas. I believe that careful and systematic examination of stools will show a large number of the boys who were overseas, especially those who were in the Argonne District, to be infected with amebiasis, and I also believe that such examination will show a good many of those who were not overseas to be infected. Even if the infection is entirely new, certainly there has been ample opportunity for infection from the returned soldiers, for, unless my findings are all wrong and unless Kofoid's findings are sadly wrong, several million boys have been scattering

amebæ without restraint for five years and nothing short of a miracle has prevented a spread of the infection; for, so far as I have been able to learn, no precautions have been taken by the health departments.

Finally, I wish to thank Miss Elizabeth Keene, our laboratory technician, for her earnest and efficient services in finding this infection. After all is said and done, we have to depend on our laboratories in making our diagnosis of amebiasis and in checking the results of treatment.

DISCUSSION

Dr. McDaniel (Minneapolis): I think that this paper is very timely, from the public health as well as the clinical point of view. Up to very recently we have all thought of amebiasis or amebic infection in terms of dysentery or as liver abscess following dysentery. The wide variation in clinical symptoms suggested by Dr. Tuttle is very interesting, particularly the symptoms referable to the nervous system which so often accompany digestive tract disturbances.

The magnitude of the public health side of it may be considered in this way. Dr. Tuttle speaks of ten per cent infections among the hospitalized ex-service men. If this ratio should hold for the ex-service men in general we might expect to have about 10,000 amebic carriers in our 100,000 of ex-service men. Dr. Tuttle's figures do not necessarily justify this estimate, but if we remember that Kofoid and Sweezy, mentioned by Dr. Tuttle, found 67 per cent of infections in the ex-service men that had been overseas, who were presumably well students in California, and 26 in ex-service men who had not been overseas, this estimate may be very reasonable. The 3 per cent oriental population of California may possibly be a factor in the wide prevalence of the infection in that state. The reports of Dr. Tuttle, Dr. Dowling and others should serve to put us on guard and lead us to take control measures. Dr. Dowling is of the opinion that those who are supposed to be well but who are carrying this organism may actually be in a lowered state of health. Our tourist visitors who come from infected regions may be a factor in the spread of this infection in our midst.

Walker, who in 1911 first separated E. histolytica from E. coli, as a distinct species, was the first to demonstrate the carrier condition in relation to E. histolytica. With Sellars he experimentally induced dysentery in human beings through the injection of the encysted forms of E. histolytica.

The active parasite is an obligate parasite and dies very soon after leaving the body. The encysted parasites, however, which readily develop in the lumen of the intestine, will survive a two or three weeks' sojourn outside of the body, provided moisture is present and they are kept cool. This affords opportunity for the spread of the disease through infected water supplies and infected food in a manner similar to the spread of infection in typhoid and dysentery. We, therefore, have a somewhat similar problem. I will not go into details as to why it is not entirely similar.

Dysentery, both amebic and bacillary dysentery, for years have been on our list of notifiable diseases, reportable to the State Board of Health. We, however, cannot help Dr. Tuttle in answering the question as to the prevalence of amebic infection before and since the war.

Exclusive of the cases reported by Dr. Tuttle we find for the five-year period (1917 to 1923 inclusive) but nine cases including three longstanding cases of amebic infection have been recorded. Two deaths recorded in 1924 raises the total cases reported since Jan. 1, 1917, to ten, one of these deaths having been reported as a case previously. Of the ten cases, seven were reported to the State Board of Health by death certificate only. Eight of these cases were in females, 2 in males. The three chronic amebiasis cases were reported as follows: One from St. Cloud in 1922: Male, age 33; primary cause of death was given as secondary anemia, duration two years; secondary cause, amebiasis, duration two years. The second case was reported in 1922 from Minneapolis: Male, aged 16; primary cause of death, acute nephritis, with uremic convulsions; secondary cause of death, amebic dysentery, ulceration of bowels, duration nine years. The third case was reported by the University Hospital, in a woman aged 35 from Otter Tail County. She was born of Finnish parents in Michigan. No data as to source of infection in these cases were obtained. It is notable that all three cases were reported from localities where excellent laboratory service is available. Dr. Tuttle's paper points out the value of routine examinations of stools both for the benefit of the patient and as a public health measure. In the control of any disease the first step is the diagnosis. The State Board of Health earnestly desires to receive reports of these chronic infections as well as the acute dysentery cases. I believe that as with typhoid fever we should receive a report also of hospital discharge of these patients, giving their destination and statement of the results of treatment and condition of patient on discharge.

Dr. L. W. Pollock (Rochester): Entamebiasis has been known to be prevalent in the Northwest for some years. Dr. Sistrunk in 1911, Dr. Giffin in 1913, and Dr. Sanford in 1914, wrote of its presence in the Northwest in patients seen at the Mayo Clinic. In 1916 Dr. Sanford in a study of the geographic distribution of entamebiasis, reported in five thousand examinations of feces for parasites the finding of 819 persons in whom entamebæ were found. Of these, 535 patients carried *Entameba histolytica*, and 284 *Entameba coli*. Eighteen per cent of the patients who had stool examination for parasites harbored one of the forms of entameba. Since 1916, the number of patients with entameba infection remains fairly constant. About 5 per cent of the patients coming to the clinic carry entamebæ in their colons.

Dobell, in 1917, in the study of the prevalence of amebiasis in the British Isles, found it to be prevalent there. In a series of cases he examined he found about 4 per cent positive findings, and estimated, on repeated stool examinations, that in 10 per cent of the cases some form of amebiasis was present. This would tend to show that amebiasis is much more widespread than is generally believed.

The types we have to deal with clinically are the *Entameba histolytica, Entameba coli* and *Entameba nana*. The *Entameba histolytica* is the pathogenic organism, the

Entameba nana may be pathogenic, and the *Entameba coli* only in heavy infection seems to produce symptoms.

Clinically patients may be simply carriers without symptoms, may have mild recurrent abdominal symptoms associated with diarrhea, or may have true dysentery. A nonsymptomatic carrier may, with a debilitating illness, become a frank dysenteric. Ten per cent of the patients have ulceration in the rectum and sigmoid which can be seen by proctoscopic examination. The ulceration is quite typical and conforms to the description given by Dr. Tuttle.

The *x*-ray study of the colon usually shows, in the filling ray, a normal outline unless there have been secondary changes, due to chronic ulceration and scar formation, when there are irregularities in the colon outline. We do not see the complications with entamebic infection in the Northwest that are seen in the tropical zone. Abscess of the liver is rare although it has been seen. In the treatment, as Dr. Tuttle has said, we can control the acute case quickly and render the patient a carrier, but to free the colon of the entamebæ requires persistence in treatment and time.

Protozoal infections are common in people residing in the Northwest and may produce symptoms. Dr. Tuttle has again called our attention to this fact.

DR. MOSES BARRON (Minneapolis): The prevalence of amebiasis in Minnesota and the surrounding states is rather striking from the statistics cited by Dr. Pollock. That amebiasis might be contracted in Minnesota was called to my attention in 1912 when I studied two cases at autopsy which showed extensive liver abscesses. In neither of these cases was amebiasis suspected since there was no history of diarrhea or other symptoms which might suggest amebic dysentery. At the autopsy smears were taken from the pus in the abscesses and sections were made from the liver tissue adjoining the necrotic material. These slides showed large numbers of entameba histolytica present both in the wall of the abscesses and in the necrotic contents. Very careful histories were obtained from the relatives and in neither case had the patients resided or traveled outside of the states of Minnesota and Wisconsin. Infection must therefore have occurred locally. At that time we thought the infection must have been brought here by the soldiers from the Spanish-American war.

In regard to the statement made by Dr. McDaniels that the motile parasites die soon after being expelled from the bowel and that therefore only the encysted forms can produce an infection, Walker and Sellards showed conclusively in their experiments in the Philippine Islands that the actively motile form will be killed by the acid contents of the stomach soon after ingestion and that therefore no infection will result. The encysted forms, however, are resistant to gastric digestion and will pass into the intestines unharmed. In their experiments they found that the ingestion of entameba coli produced no symptoms or lesions. Large numbers of Philippine soldiers fed with material containing entameba coli in capsules remained well, but those fed with entameba histolytica developed the typical entamebic dysentery.

DR. TUTTLE (St. Paul): In regard to Dr. McDaniel's statement relative to the cases not being reported: they were not diagnosed correctly, and that is my main point, and I think if the doctors would make a personal investigation and one not done by mail they would find a lot of entameba cases. You can find them, but you won't find them in the postoffice; they don't come that way.

As to reporting these cases and comparing them with typhoid I want to say that typhoid used to kill about 10 per cent of the cases; it doesn't now. Amebiasis puts a man out of commission for three or four years. I would rather die now than be out of commission for years. I have a boy in the hospital whose salary is $250 a month, every day he can work. Now he is getting $80 a month, and he wants to get back to work. This man has been cleared up of his Entameba histolytica, but he has no pep. He says, "I break right down. I get mad at my customers," and that is an important thing to consider. If I had reported 100 cases of typhoid fever Dr. Chesley would have been on my neck in fifteen minutes. But nothing is done about amebiasis. These are strictly Entameba histolytica cases. This report does not include cases that were examined after staining and only cysts were found. It includes only those in which the red blood cell was found in the ameba. We have found a large number infected with E. coli, but they are not included. This E. coli may be non-pathogenic, but I don't want it in my intestinal canal.

The symptoms are misleading, as shown by the diagnoses under which cases are sent to the hospital. One case from the N. P. ward just complained of being dizzy. One patient was afraid he was going to die of cancer of the stomach because his father died of that. We had to watch him to keep him from committing suicide. That boy today is doing very well.

B. PAUL'S HENNA AND LIQUID HAIR DYES

Two hair dyes are put out by one Paul Balme, who does business in New York City under the name "B. Paul." One of these dyes is known today as "Paul's Henna" and is a powdered mixture. The other, put out by the same man, is called "B. Paul's Liquid Mixture." B. Paul's Henna comes in a tin can and is claimed to be "* * * a powdered preparation composed of pulverized henna and herbs which will color gray hair to any one of our fourteen different shades." Accompanying this powder is a small envelope containing a white powder and labeled "B. Paul's Developer: to set the shade." For use, the hair must be washed, the powder applied in the form of a thick paste and left on for from thirty minutes to two hours; the hair is then rinsed and treated with a solution of the "developer." The A. M. A. Chemical Laboratory reports that the "henna" powder consists essentially of dried plant leaves, pyrogallol, iron and copper compounds, and that the "developer" is sodium perborate. The Laboratory also examined the liquid preparation. The preparation was contained in two bottles: one was essentially a solution of the well-known copper ammonium sulphate, the other was a solution of pyrogallol. *(Journal A. M. A., Nov. 1, 1924, p. 1449.)*

THE PRESENT STATUS OF MILK PASTEURIZATION IN MINNESOTA

H. A. WHITTAKER, Director
and
R. W. ARCHIBALD, Bacteriologist
Division of Sanitation,
Minnesota State Board of Health
Minneapolis

Pasteurization is universally recognized as the most dependable and economical method of rendering milk safe for human consumption. Health authorities agree that all market milk should be pasteurized unless it is produced and handled under conditions similar to those required for certified milk. The process is applied primarily for the purpose of overcoming certain dangers from the transmission of communicable diseases through raw milk which may not be eliminated by even the most intensive dairy and medical inspection. One cannot always be sure that the dairy cow, and all persons engaged in the production and handling of the milk, are free from communicable diseases at all times. In cities where all the milk supply is properly pasteurized, outbreaks of milk-borne diseases have been eliminated. The United States Department of Agriculture makes the statement that "no epidemic of disease has ever been traced to properly pasteurized milk." Pasteurization is also an important economic measure in that it makes it possible for cities to maintain a safe milk supply at a price within the reach of the average consumer.

The marked increase in the amount of milk pasteurized in the United States is largely an indication of an appreciation by the public of its value as a health measure. An average of more than 95 per cent of the milk is pasteurized in the cities of the United States with a population of 500,000 or more. In Minnesota, an average of more than 50 per cent is pasteurized in cities of a population of 5,000 and over. One city in the state has adopted an ordinance that requires the pasteurization of all milk. Every year shows an increase in the number of pasteurization plants and in the amount of pasteurized milk consumed.

The term pasteurization as applied to milk means heating it to a temperature of not lower than 145° F. for not less than thirty minutes. This does not render the milk sterile, but destroys the disease-producing bacteria.

Pasteurization does not change appreciably the chemical composition of milk. Pasteurized milk tastes practically the same as raw milk and the food value is not materially affected, with the possible exception of a partial destruction of one vitamin. There is little known of the real chemical nature of vitamins except that they are necessary for normal growth and health. Milk contains all three vitamins and the effect that pasteurization may have on them is of importance. Fat-soluble vitamin A and water-soluble vitamin B are quite resistant to heat and it is agreed that pasteurization has little or no effect upon them. The antiscorbutic vitamin C is sensitive to heat at about 122° F. While the destruction of this vitamin depends upon various factors, such as oxidation, temperature, etc., pasteurization undoubtedly weakens the antiscorbutic property of the milk to some extent. It has been found that milk freshly drawn from the cow at certain times of the year does not always contain a sufficient quantity of vitamin C to protect against scurvy. This variation in the vitamin content of the milk is influenced by the kind of food which the cow receives. Since even fresh, raw milk may not contain a sufficient quantity of vitamin C most physicians recommend that this vitamin, which is present in orange juice, tomato juice, etc., be added to the child's diet when cows' milk is substituted for breast milk. In view of the fact that vitamin C must be substituted in the infant's diet regardless of whether or not the milk is pasteurized, a partial destruction of this vitamin resulting from pasteurization is of little practical importance. Since adults do not depend on milk as a source of vitamin C, pasteurization cannot be said to have a detrimental effect on the food value of milk insofar as they are concerned.

The Minnesota State Board of Health has supervised the pasteurization of milk since 1917, when a survey was made of all pasteurization plants in the state, not including those in Minneapolis, St. Paul and Duluth. Investigations, including a field survey and bacteriological examinations, were made at thirty-two plants. It was found that pasteurized milk was sold in all but seven cities in the state with a population of 5,000 and over and that the word "pasteurized" was used largely as a trade name. The methods of pasteurization as carried out at many plants had practically no significance from a health point of view. For instance, at five plants milk was found labeled as pasteurized

where there was no pasteurization apparatus and no attempt was made to subject the milk to a heating process. None of the plants were provided with recording thermometers to show the temperature to which the milk was heated and the length of time it was held, and the pasteurizing temperature varied from 135° F. to 185° F. At a number of plants the milk was sold as pasteurized throughout the year, but was only heated during the summer months for the purpose of improving its keeping qualities. The survey indicated conclusively that the mere presence of pasteurizing equipment at a plant or the fact that the product was labeled "pasteurized" did not insure safe milk. It was further evident that if the pasteurization of milk was to be of value from a health point of view, definite standards for the process must be prescribed and enforced at every plant. As a result of the survey, the State Board of Health passed regulations defining the pasteurization of milk in Minnesota and outlining the requirements which must be complied with at pasteurization plants.

The following is a list of some of the essential requirements which plants must comply with in order to meet the regulations of the State Board of Health:

1. *Building:* The building in which the plant is located should be properly lighted and ventilated. Separate rooms for pasteurization of milk and washing utensils should be provided. Raw milk delivered to the plant should not be unloaded directly into the pasteurizing room. All floors should be constructed of impervious material and should be sloped to drains and gutters of adequate size. Suitable toilet facilities should be available for use of employees. Hand washing facilities with soap and clean towels should be provided. The entire plant should be maintained in satisfactory sanitary condition and should be effectively screened against flies.

2. *Heaters and Holders:* The apparatus should insure the heating and holding of the entire quantity of milk at a temperature of not lower than 145° F. for not less than thirty minutes. The equipment should be as simple as possible in order to insure proper operation, and so that it can be effectively cleaned and sterilized.

3. *Thermometers:* A recording thermometer should be provided to show the temperature to which all milk is heated and the length of time held. The thermometer charts should be dated and changed daily and the chamber kept locked. The thermometer should be checked at frequent intervals to determine its accuracy.

4. *Coolers and Storage:* Facilities should be provided for promptly cooling the pasteurized milk to 50° F., or below. Open surface coolers should have a tightly fitting cover. The refrigerator should insure the storage of the milk at a temperature below 50° F.

5. *Bottle Filler and Capper:* A machine filler of an approved type should be provided. Caps should be placed on the bottles with a machine capper of the hand or automatic type. They should be placed in the capping machine in the original tubes in which they are received from the manufacturer. Pasteurized milk should be placed in the containers in which it is to be delivered immediately after it is cooled.

6. *Pipes, Pumps, Fittings, Valves, and Covers:* The pumping of milk after it is pasteurized should be eliminated as far as possible. Pumps should be an approved sanitary type, and constructed of non-corrosive material. They should be so designed that they can be readily taken apart for cleaning. All pipes, fittings and valves should be of the sanitary type, and should be so constructed that every part can be opened. The use of blind or closed elbow joints is prohibited. The arrangement of the plant and the location of the equipment should be such that the amount of piping is reduced to a minimum. By-passes and cross-connections in the pipe line are not permitted. Pasteurized milk should not be passed through pipes and pumps which earlier in the run are used for unpasteurized milk. All apparatus in which milk is stored, pasteurized, or handled, should have proper covers to prevent exposure.

7. *Cleaning and Sterilization of Pasteurization Apparatus:* The entire apparatus, including all pipes, pumps, etc., should be taken apart each day and thoroughly washed. After reassembling, and just prior to the run, they should be effectively sterilized.

8. *Bottles and Cans:* Facilities should be provided to insure effective sterilization of bottles and cans. After they are sterilized the bottles should be stored in the cases in an inverted position until ready for use.

9. *Medical Examination:* All persons in pasteurization plants engaged in the pasteurization or bottling of the milk, or cleaning or sterilizing of

milk apparatus and utensils, should pass the medical examination prescribed by the State Board of Health to determine that they are not chronic carriers of infectious diseases.

The routine work carried out by the State Board of Health in the supervision of the pasteurization of milk consists of:

(1) The examination of plans for proposed pasteurization plants or changes in existing installations. The regulations of the State Board of Health provide that no plant shall be installed for the pasteurization of milk or any existing plant materially altered or changed until complete plans and specifications for the installation, alteration, or extension have been submitted and approved by the Board.

(2) Investigation of new plants after completion to determine that the building and equipment have been constructed and installed in accordance with the approved plans.

(3) Routine investigations at existing plants in company with the local officials to determine that the equipment, methods of pasteurization, and sanitary conditions comply with the regulations of the State Board of Health.

The daily routine inspections made to determine whether proper methods of pasteurization are being carried out is a function of the local health department, since it is impossible for the State Board of Health to assume the responsibility of detailed supervision. Legal authority is necessary in order that the local officials may properly supervise the pasteurization plants. This authority must be provided by the passage and enforcement of a local milk ordinance. An ordinance for cities not in Class 1 has been prepared by the various state departments interested in milk supervision and the State Board of Health and the other departments have taken active steps to induce municipalities to adopt it. The co-operation that local authorities have extended in this work has been very gratifying. In 1917, only two cities in the state outside of those in Class 1 had effective local supervision of the milk supply, while at the present time more than seventy-five cities have adopted the approved ordinance with the changes necessary to meet local conditions. The supervision work on pasteurization since the passage of the regulations by the State Board of Health has resulted in a marked improvement in the safety of pasteurized milk. There are now fifty-two plants located in thirty-one cities, not including Minneapolis and St. Paul, where the building and equipment and methods of pasteurization have been approved by the State Board of Health. Plants that do not comply with the regulations are ordered to discontinue labeling, advertising, or selling their product as "pasteurized" until the unsatisfactory conditions have been eliminated.

A summary of the bacteriological examinations at the plants shows that in 1919 no samples were obtained with bacterial counts under 25,000 per c.c., while in 1923-1924, 20 per cent of the samples were under 10,000 per c.c. and 52 per cent were under 25,000 per c.c. In 1919, 88 per cent of the samples had a bacterial count of more than 50,000 per c.c., while in 1923-1924, only 17 per cent exceeded this figure. The high counts found in 1923 and 1924 were the result of improper methods of operation of the plants, and these conditions were remedied at once or the plants were ordered to discontinue the sale of pasteurized milk.

The most urgent need at the present time in the improvement of market milk in Minnesota is a greater appreciation by the public of the importance of a safe milk supply, and with this a better understanding of pasteurization and of its merits as a health measure.

AOLAN NOT ACCEPTED FOR N. N. R.

The Council on Pharmacy and Chemistry reports that Aolan is prepared from milk freed from fat and is claimed to be a germ-free and toxin-free solution of lactalbumen, manufactured in Germany for the H. A. Metz Laboratories, Inc. The use of Aolan is recommended by intramuscular and intravenous injection in a large number of conditions. The Council found Aolan inadmissible to New and Nonofficial Remedies because it is marketed under unwarranted therapeutic claims. When the Metz Laboratories was informed of the Council's decision, the firm sent a detailed reply. After considering this reply, the Council decided that the rejection of Aolan should stand. The Metz Laboratories, Inc., does not hold itself responsible for the many and varied claims made for non-specific protein therapy and the uses of Aolan in connection therewith which have appeared in print. Although the claims advanced by the American agent are relatively moderate, they are still unacceptable, because they are unsupported by controlled clinical evidence from reputable observers. *(Journal A. M. A., Nov. 8, 1924, p. 1526.)*

ROUTINE EXAMINATION AND MANAGEMENT OF THE NEWBORN*†

OLIN W. ROWE, M.D.
Duluth, Minn.

About eight years ago the section on Pediatrics of the Duluth Clinic undertook the daily examination and management of the babies born on the obstetrical service, with the hope of establishing a routine which would favorably influence the high morbidity and mortality of the first weeks of life. The most essential points to be secured were recognized as: (1) breast feeding; (2) protection from infection; (3) normal temperature; (4) the early recognition of abnormalities when existing; (5) prompt treatment when necessary. Our results, and those of other clinics and hospitals with a similar service, show that much has been accomplished, and with improved technic and increasing knowledge that the ideal may be approached, if not actually reached. The purpose of this article is to outline the general plan followed, list some of the conditions encountered, and discuss briefly some phases of these which seem of interest.

The necessity of establishing a service wherein the newborn receives a thorough examination immediately after birth and daily observation during the period immediately following, has long been recognized, and is so obvious that discussion is unnecessary. Emphasis is necessary, however, on the close relationship and co-operation that must exist between the obstetrician and the pediatrist when the work is done by two different services. In general practice the same routine can be followed and like results obtained if the physician is willing to devote the necessary time. Wide experience and special training are desirable, but not necessary, in order to make satisfactory examinations. Every physician should be familiar with the characteristics of the newborn and capable of recognizing deviations from the normal.

ROUTINE CARE

Our routine care is as follows: As soon as the cord is tied (occasionally before), a 1 per cent silver nitrate solution is dropped into each eye. The temperature is taken and the body cleansed with warm olive oil. The child is then weighed, dressed in warm clothes and wrapped in a warmed blanket. The temperature is taken every four hours. When necessary, the infant is placed in a cubicle in our newborn ward, which may be heated to any desired degree and in which the proper humidity may be maintained. The bleeding time and coagulation time is taken daily for the first three days. The Rodda technic for determining the coagulation time is employed.[1]

The baby is put to the breast once or twice in the first twenty-four hours if the condition of the mother permits, and it is nursed every four hours, five times daily, after the first twenty-four hours. This feeding schedule is adhered to in the average case. Some sick infants, prematures, and an occasional normal baby, require different feeding intervals, and a modification of our routine is made when indicated.

Daily baths are given when the condition of the infant permits. The spray from a tank, accurately regulated as to temperature and force, is used.

The babies are kept in metal baskets and are removed only when necessary to bathe, feed, dress or examine.

The same aseptic technic followed in the operating room is used in the nursery. Water is given at regular intervals. The prematures get a quantity of water equal to 10 per cent of their body weight. Prematures and weak babies are fed from the breast when possible, but by tube if necessary. If the mother is unable to nurse her baby, breast milk from other mothers on the service or from the Breast Milk Dairy is given. Occasionally complemental artificial food is necessary, and then a whole lactic milk with corn syrup is used. All prematures are given small doses of cod liver oil after the first week.

The baby, chart and stools are inspected daily. This permits an early recognition of untoward conditions which develop after the first day, and the prompt practice of preventative pediatrics.

Recently the records of 638 newborns were reviewed. These were of consecutive births, except that records of stillborn infants and those dying in the hours between birth and the first visit of the pediatrist were excluded. Abnormalities, with the exception of mastitis, icterus neonatorum, and a few other conditions which seemed to have no bearing on the progress of the infants examined, were noted. All of the mothers were private patients and had been under the care of an obstetrician for

*Read before the annual meeting of the Minnesota State Medical Association, St. Cloud, October 10, 1924.
†From the Section on Pediatrics, The Duluth Clinic, Duluth, Minnesota.

varying periods, usually extending over many months. The economic level of the parents was well above the average.

The birth weight is one of the most important observations recorded. While it is only one of the factors concerned in the velocity of growth it is the one most frequently consulted.

The average weight of the 327 boys was 3,374 grams. The average weight of the 311 girls was 3,161 grams. These weights are lower than those recorded by Faber[2] for the same number of infants in a San Francisco clinic. They approximate the figures of Holt and some other observers in different sections of the country.

The following figures are the averages for the series: The weight loss following birth was 6.5 per cent of the birth weight. The lowest weight was reached in two and one-half days. The birth weights were regained at four and one-half days. Some of the variations from these averages were very wide in apparently normal babies.

We have come to regard a weight loss of more than 7 per cent and a failure to regain birth weight by the fifth day as not necessarily abnormal, but when occurring should immediately attract attention and arouse suspicion of possible abnormal physiologic or nutritional conditions.

INCIDENCE OF ABNORMAL CONDITIONS OCCURRING IN THE 638 NEWBORN INFANTS EXAMINED

Number

1—Double Talipes Equino Varus
1—Amyotonia Congenita
1—Cystic Kidney
2—Monsters
3—Accessory Digits
2—Mongols (1 with congenital dislocation of hips)
1—Atresia of Common Bile Duct
1—Dermoid of Buttocks
4—Spina Bifida
1—Atresia of Esophagus
1—Hydrocephalus
2—Imperforate Anus
1—Atelectasis
1—Infection of Navel (Diphtheria)
1—G. C. Conjunctivitis
18—Premature
32—Fever (Anhydremia)
2—Fractures
1—Meningitis (Bacillus Coli Communis)
4—Obstetrical Paralysis
6—Hypertrophy of Thymus
9—Traumatic Hemorrhage { 3 Sternomastoid; 4 Cephalhematoma; 2 Cerebral }
12—Hemorrhagic Disease

Twins were encountered 11 times.

FEVER IN THE NEWBORN

In the early cases of this series a temperature exceeding 101 degrees Fahrenheit was encountered in 12 per cent of the babies at some period between the second and sixth day. This was regarded as an inanition fever. The high percentage was a direct result of enthusiastic efforts to establish breast nursing in all infants. In a short series that were fed high sugar solutions and expressed milk in sufficient quantities to prevent the normal initial weight loss, no fever was observed. It was also noticed that infants losing less than 7 per cent of their birth weight did not show an abnormal temperature. This seemed to bear out the supposition that we were dealing with an inanition fever. A routine was therefore established of complementing the milk obtained by the baby from the breast with sufficient expressed milk or modified cow's milk to bring the total caloric intake above one hundred calories per kilogram of body weight. Under this regime the babies ran a normal temperature.

Marriott's[3] work on anhydremia has convinced us that this temperature is not a result of too little food, but is due to a drying of the tissues and body fluids. He has shown that the newborn infant has a very high water requirement, which if not met results in a marked degree of desiccation. This drying-out process is accompanied by fever.

Bakwin, Morris and Southworth[4] have shown that infants exhibiting this fever have a protein concentration of the blood serum exceeding 7.5 per cent, whereas the normal is rather constant, lying between 6 and 7 per cent. When they gave fluid per mouth, in the proportion of from 30 to 40 c.c. per kilogram of body weight, a prompt fall in temperature and blood concentration followed with great regularity, the temperature usually reaching normal within from thirty to ninety minutes.

While we were slow to attribute the success of our treatment to the control of anhydremia, we found that only slight changes were necessary in our routine. The babies are weighed daily. If the weight loss is unusually rapid on the first or second day, or if the weight loss for the first three days exceeds 7 per cent of the birth weight, complemental food is added in sufficient dilution to make the total intake of fluid equal 10 per cent of the body weight, and of sufficient strength to furnish at least one hundred calories per kilogram of body weight.

If the fever still persists, the cause is probably one of the various infections.

IMPERFORATE ANUS

When the intervening tissue between the pelvic rectum, growing downward from the caudal end of the hind-gut and the proctodeum, developing from a plate of epithelial cells at the site of the future anus, fails of absorption, a condition described as "imperforate anus" results. Two such cases were encountered.

In the first baby the rectum ended in a blind pouch, approximately three centimeters from the site of the anus. The normal musculature of the anus was lacking, but a few fibers were found at operation. The rectum could be felt impinging on the fingers when the baby strained. Operation was successful.

The second baby had a fistulous opening into the vagina, about midway of the perineum. Operative treatment was considered unnecessary and inadvisable at this time, as the fistula was sufficiently large to allow free emptying of the bowel. The technical difficulties encountered later, when a plastic operation was made, proved that this was good judgment. The baby, however, developed a cystitis, and later a pyelonephrosis, which was extremely obstinate.

INFECTION OF THE NAVEL

Infection of the navel, of sufficient severity to produce marked inflammatory reaction, was encountered in only one case in this series. This is attributed to the simple routine treatment, which is as follows: The cord is cut extremely short, and the stump is painted with iodin and covered with a sterile dressing. This is inspected daily. More recently the clamp devised by Ziegler has been used.

The one baby developed a marked swelling of the tissues about the navel, without much induration, but with considerable exudate with a foul odor. Direct smears did not show diphtheria bacilli, and the case was not correctly diagnosed until the obstetrician reported diphtheritic pharyngitis in the mother. One injection of diphtheria antitoxin hastened healing.

Examination for diphtheria bacilli should be made in all cases of suppurative infection of the umbilicus.

Occasionally a small granulomatous tumor is found in the umbilicus after the separation of the stump. The surface of the tumor is irregular, red, and frequently covered with a serous fluid. Healing is delayed. Cauterization with a 10 per cent silver nitrate solution is usually all that is necessary, but the larger tumors may need ligation.

OPHTHALMIA NEONATORUM

It is interesting to note that one case of gonorrheal conjunctivitis developed in spite of the usual silver nitrate treatment. Fortunately it was mild in degree, and responded rapidly to the accepted treatment. The fact that this infection can occur under such conditions is of especial significance to hospitals which keep all the newborn in one ward and depend entirely on the Credé treatment for prophylaxis. This experience has made daily examination of the eyes a part of our routine.

Occasionally a non-specific conjunctivitis is seen. These cases are characterized by edema, photophobia, and a small amount of discharge, which may be purulent. This is regarded as a result of mechanical causes or secondary to irritation caused by the Credé treatment. Mild boric acid solutions were used with excellent results.

OBSTETRICAL PARALYSIS

Obstetrical paralysis (a paralysis produced during birth) is due to an injury of the brachial plexus. The paralysis following such an injury is characteristic: the arm hangs limply by the side, the forearm pronated, and the whole arm inwardly rotated. The paralysis is usually flaccid.

The condition is easily recognized. A flaccid paralysis limited to a peculiar group of muscles occurring in the newborn can scarcely be confused with that of cerebral origin. A peculiarity is that the triceps is not affected, so the power to extend the forearm remains, although it cannot be flexed.

The commonest form of obstetric paralysis is the well known upper arm type or the Duchenne-Erb type, first described by Smellie in 1768, but first brought prominently before the medical profession four years later by Duchenne, who described four cases in infants. This is often called "Erb's paralysis," incorrectly, however, since Erb's description was of a similar condition in the adult, produced by injury to the fifth and sixth cervical roots.

A rather rare form of this paralysis is known as the lower arm, or "Klempke" type, which is concerned with a disturbance of the lower roots of the brachial plexus, the seventh and eighth cervical and first dorsal root, and gives rise to disturbance

chiefly along the distribution of the ulnar and median nerves.

A combination of these two types may occur and be of such severity as to result in complete paralysis of the arm.

In our series there were four cases. All were breech presentations or podalic versions, and implied the application of force, with marked muscular relaxation of the child. Three were of the upper arm type, and one was of the combined upper and lower arm type.

While the extent of the injury is the greatest factor in the prognosis, promptness of treatment is next in importance. This cannot be too strongly emphasized. In children with approximately the same degree of paralysis as those of this series, but who came under observation at periods of from three weeks to two months after birth, the results were not so satisfactory and the time treatment was necessary and was materially prolonged.

We have put all of our cases up in splints and kept the arm warm.

The position in which the arm is held is as follows: The arm is elevated away from the body at an angle of 90 degrees. The forearm is flexed at right angles, with external rotation. The essential point is external rotation of the arm at the shoulder, and fixation. This position prevents further injury to the plexus, allowing the nerves in the surrounding tissues every opportunity for repair. It prevents contraction which results in the deformity known as "policeman's tip," and avoids muscle stretching, with its attending atrophy.

Massage has no place in the treatment during the first few weeks.

I am convinced that prompt recognition and the application of the splint will be all that is necessary in the milder cases of the upper arm type, that it will render the greatest service in the severer cases, and will materially reduce the number of children needing the services of an orthopedist later.

THYMUS HYPERTROPHY

The clinical diagnosis of this condition is possible, but it should always be confirmed by the roentgen ray. The condition is suspected in all cases of difficulty in establishing normal respiration, in attacks of recurring cyanosis and in convulsions. The roentgen plate should be made at the end of expiration, when the thymic shadow is largest. Fluoroscopic observation is of decided importance, as it more clearly shows the size of the organ and its fluctuation during respiration—particularly forced respiration, as produced by crying.

Eight of our babies presented clinical symptoms attributable to thymic disturbance, making closer study necessary. Six of these showed definite shadow in the region of the thymus. This small number, in the light of Peterson's[5] recent studies, indicates that only the babies with pronounced symptoms were recognized as having possible thymic enlargement. Many cases were undoubtedly overlooked. One reason for this may be that respiratory delay is frequently encountered by the obstetrician but the condition is overcome by the time the pediatrist makes his examination, and in the absence of a definite history no trouble is suspected.

All babies in our series, with proven thymic hyperplasia, were treated by the roentgen ray. The technic of the treatment is as follows:

The child is given 5 milliamperes at a 7.5 inch spark gap for from three to five minutes per area. Two areas are used—one on the chest and one on the back—the target skin distance being ten inches, with a filter of 4 millimeters of aluminum. About fifteen minutes per area per three weeks is the maximum safe dose. This, however, is seldom required, improvement being noted after three-minute applications to the chest and three minutes to the back. The thyroid gland must be safely protected by a shield.

In every case treated the symptoms promptly disappeared.

No treated case has developed symptoms attributable to the thymus.

Some of our experiences in older children, with sudden death attributable to dyscrasias of the thymus in association with infections, have been reported by Kohlbry.[6] These, and similar experiences, with sudden death in association with the first severe infectious process, operation or injury occurring in patients with demonstrable thymic disturbance, make me conclude that all cases showing definite thymic enlargement should be treated by the roentgen ray, in order that potential dangers from thymic dyscrasias be eliminated.

HEMORRHAGE

So much has been written on this subject during the last few years that no extended discussion is

necessary. Of the hemorrhages occurring in this series, the first nine were considered to be due to injury, history of injury having been obtained, and no changes in the bleeding or coagulation time observed. Subcutaneous injections of blood were given, not only for the immediate effect, but also as a prophylactic measure against the possible development of the hemorrhagic disease. Two of the hemorrhages into the sternomastoid were diagnosed on the first day. The third escaped observation until later. It was thought at the time that this hemorrhage occurred late, but it is more probable that the soft, diffuse mass was not discovered in the short, fat neck until after organization of the clot had taken place. In the last fourteen cases marked changes in the coagulation time were obtions were repeated if symptoms of hemorrhage appeared. In one pair of twins, one baby bled extensively, while the other remained normal. In another pair of twins, one showed extensive hemorrhage forty hours before the other developed symptoms suggesting cerebral hemorrhage.

It is very probable that small cerebral hemorrhages occurred in some babies in this series and were unrecognized. We have found the condition at times very elusive. The clinical picture is usually very sharp, but repeated spinal punctures are done on all babies presenting indefinite symptoms not attributable to other causes. Hemorrhages occurring into the brain tissue may not show a bloody fluid on spinal puncture. The use of the spinal mercurial monometer has not been of the assistance

ST. MARY'S HOSPITAL

Date of Exam.

Name Address Date and Hour of Birth

Male Female Weight Length Head Chest Abdomen A. Font. Tension

Treatment: Eyes Cord

General Condition

Anomalies or Injuries

Date _____

Coagulation Time _____

Bleeding Time _____

Term Premature at Stillborn

Examination on Discharge: Weight Gaining Stationary Losing Gen. Condition

Skin Eyes Genitals

Breast Navel

This is the blank used for recording examinations of the newborn. On the reverse side is the first temperature and weight chart.

served in all but one. In this baby both visceral and cerebral hemorrhages were very extensive. The hemorrhages were regarded as due to changes occurring in the blood described as the hemorrhagic disease, although the coagulation time was within normal limits on three consecutive days, as determined by independent observers.

In three families the hemorrhagic disease appeared three or four times. Needless to say, babies born to parents presenting this history received subcutaneous injections of blood at birth from donors outside the immediate family. The injec-

expected. In the presence of a normal reading and a clear spinal fluid, blood should be given if symptoms, possibly due to cerebral hemorrhage, persist.

I wish to express my appreciation to Dr. W. A. Coventry for his active co-operation in this work and to Dr. C. O. Kohlbry for numerous physical examinations.

BIBLIOGRAPHY

1. Rodda, F. C.: A method for determining the coagulation time of blood in the new-born. Am. Jour. Dis. Child., 19:268, April, 1920.

2. Faber, Harold K.: Study of the growth of infants in San Francisco with a new form of weight chart. Arch. Pediat., 37:244, April, 1920.
3. Marriott, W. McK.: Anhydremia. Physiol. Rev., 3:275-294, April, 1923.
4. Bakwin, Morris and Southworth: The effect of fluid on the temperature and blood concentration in the newborn with fever. Am. Jour. Dis. Child., 27:578, June, 1924.
5. Peterson, Rueber and Miller, Norman F.: Thymus of new-born and its significance to obstetricians. Jour. Am. Med. Assn., 83:234, July 26, 1924.
6. Kohlbry, Carl O.: Status thymico-lymphaticus in infancy. Minn. Med., 6:89-97, Feb., 1923.

DISCUSSION

DR. F. C. RODDA (Minneapolis): I feel very much indebted to Dr. Rowe for the very nice presentation of a subject which is very important. Fifteen or twenty years ago very little attention was paid to the new-born. If it died, no effort was made to determine the cause, and if it survived to eventually show a displaced diaphysis or Little's disease it was charged to accident. The first work was done by Von Reuss in Vienna about 1910, and in 1912 Dr. Sedgwick with Dr. Litzenberg's co-operation established at the University of Minnesota a new-born clinic. Now we have them in a great many different universities throughout the country. There is growing up in the medical literature at the present time a large amount of material on diseases of the new-born, and although we have learned and gleaned a few things it is still a virgin field. One of the first things we found on our post-mortem examinations at the University was that somewhere about 40 or 50 per cent of all the deaths of the newly born that lived for two or three days were due to a cerebral hemorrhage, and this at once brought out the importance of this subject. We feel that a routine examination does not need to be exceedingly intricate. It is largely a matter of inspection of the babies and the observation of the patients during the first few days of life.

There are just one or two things that I would like to speak of. One is the question of thymus. A few years ago we recognized a status lymphaticus in those individuals who died suddenly without apparent cause. Now we are finding a great many conditions: difficult nursing, babies having sinking spells, babies having convulsions, difficulties in respiration due in many instances to an enlarged thymus. We are finding quite a large percentage of cases of enlarged thymus, not as large as Dr. Peterson has reported, but still enough to make up a considerable series. We have obtained brilliant results in the relief of these symptoms by the simple application of *x*-ray or radium. In our experience the *x*-ray has given the better results.

Just a word about hemorrhagic disease. In order to get any results we should have a very early recognition and very prompt treatment. We noted one or two things recently in connection with this. Occasionally we do not get the brilliant results that we have anticipated or had in certain other cases, and we have found it distinctly advantageous in several cases to change the donor. We haven't carried out any tests as yet to show any chemical changes or differences in the blood of the donors, but we have had instances where no relief has been afforded by giving the mother's or the father's blood but when shifting over to another donor, for instance the uncle, we have had very satisfactory results.

The so-called impetigo of the new-born is a very troubling condition with those who have occasion to use hospitals. There have been violent epidemics which alarm the mother and are thought by the mother to be a contamination of the child by a careless nursing. We have found that little can be done by isolation, that they heap up in an epidemic wave. Some work has been done during the last year or two, and I feel that very presently we will be able to explain this. These cases are due to a very particular strain of the staphylococcus. I believe that practically all these cases are concerned with a carrier,—nurse, mother or individual who is harboring this particular strain in the skin and transports it to the child. I feel that more can be done to prevent the prevalence of impetigo of the new-born. Though it is not serious as far as the baby's life is concerned, an epidemic brings great discredit to the obstetrician, the pediatrician and the hospital concerned.

DR. W. R. RAMSEY (St. Paul): This subject is a tremendously interesting one and is very vital. It isn't sufficient any more that the obstetrician or the practitioner hand over a seven or eight pound baby to the grandmother and say, "This baby weighs seven or eight pounds and is quite normal," without thoroughly examining the child. Dr. Rowe covered this field so very well that I am just going to mention one or two points which are so common that we have all seen them.

To illustrate how very important it is to make a really searching examination and to take into consideration all the facts, I just happen at the present moment to have a young child two and one-half months old under observation at the children's hospital. Like some 33 per cent of the normal children it had icterus neonatorum. When it came from the hospital at the end of eight or nine days the jaundice had almost disappeared and the stools were yellow in color. Then the jaundice began to increase and since then for two months the baby has been jaundiced with no bile at all in the stools. They were absolutely white. The condition was assumed to be a congenital obstruction of the bile ducts, but the fact that there was bile for a period, demonstrated that it probably was not. All that I did was to make some rather deep manipulations over the gall bladder, and the next day the stools were again yellow and the jaundice is clearing up, showing that the obstruction was probably due to adhesions from an infection through the umbilicus.

A very common thing and one that the medical man, without exactly neglecting it, often overlooks in his hurry is conditions that interfere with the nursing. The baby is not nursing normally and the mother, or the nipples or the milk are blamed. When a careful examination is made it frequently will reveal some abnormality in the breathing apparatus, not infrequently a complete blockade of the postnasal space by adenoid tissue or some abnormality of the tongue or some part of the sucking apparatus.

The subject of congenital heart conditions is interesting. The sounds are not infrequently normal, so that the doctor is not always to be blamed if he does not detect one of these congenital hearts.

The subject of undescended testes which was mentioned today is most interesting and is very frequently overlooked. It is rather embarrassing for the doctor to have the child examined six months later by somebody else and to have him tell the mother that the baby has one or both undescended testes.

On the question of thymus there has been a lot of interesting work done and the *x*-rays shown by Dr. Rowe have been extremely interesting. There is one point which was brought out very well by Dr. Gertstenberger, of Cleveland, in pictures that he showed some years ago, which I happened to see, of a case that was thought to be a thymus enlargement, in which the thymus seemed to show very definitely. He found, however, that it depended on when the picture was snapped, whether during inspiration or expiration, whether the thymus showed in the *x*-ray. The treatment by the *x*-ray is efficient but I just want to caution you against the over-enthusiasm shown by some people since an article was read at the last meeting of the American Medical Association. One enthusiastic member of the profession down East is advocating treating all children with the *x*-ray to prevent enlargement of the thymus. I think Dr. Rowe's paper excellent and I am very glad to have heard it.

Dr. August Kuhlmann (Melrose): I would like to ask Dr. Rowe what treatment he used with this spinal hernia or spina bifida as you call it, and what results he had.

Dr. O. W. Rowe (Duluth): In answer to the last doctor will say that all cases of spina bifida that are amenable to surgical treatment are operated. This means approximately 10 per cent give good results. I believe that the technic is that of other simple hernias. Our cases are referred to the surgical division as I am a pediatrist and not a surgeon.

I am deeply indebted to Dr. Rodda for mentioning the hemorrhagic disease. Anything that he says on the subject is of course authoritative. We use blood frequently as a prophylactic measure in difficult or prolonged deliveries and for families giving a history of bleeding. One of these had four consecutive children that were bleeders, and another three. These were given blood from donors outside the immediate family at birth.

Dr. Ramsey brought up the question of when the roentgen plate is made. It is taken at the end of expiration, and a fluoroscopic examination is also made. That latter is really quite important. You can catch the thymus by this method very much easier than you can any other way.

LAVEX

Lavex, of the Lavex Chemical Company, Kansas City, Mo., appears to be a new name for what used to be called "Maignen Antiseptic Powder," put out some ten years ago by the "Maignen Institute for the Study of Bacterial Diseases" of Philadelphia. At that time, it was claimed to be a mixture of calcium hydroxid, sodium carbonate, aluminum sulphate and boric acid. The Council of Pharmacy and Chemistry reported on Maignen Antiseptic Powder in 1914. In 1915, the government declared Maignen Antiseptic Powder misbranded. *(Journal A. M. A., Nov. 29, 1924, p. 1787.)*

THE CARE AND TREATMENT OF JUVENILE DIABETES*

F. W. Schlutz, M.D.
Minneapolis

The problem of the treatment of juvenile diabetes is quite different from that of the adult. It is decidedly more difficult. The rapid, at times even fulminating, course makes it a dangerous disease at all stages and one in which—until very recent date—the prognosis was anything but hopeful.

The problem of the diet is more formidable in the child than in the adult. We have the extra load for the requirement of growth and the greater activity of the child to contend with. Marked restriction in the diet is severely resented and undernutrition is poorly tolerated.

Anorexia is frequently an early and troublesome factor.

A combination of high fat diet with low carbohydrate diet easily leads to trouble and expresses itself in the rapid development of acidosis with early manifestations of coma.

Infections, dreaded as complications in diabetes, are far more common in children than in adults.

All the contagious diseases occur largely during the age of childhood. Throat and nose infections are also more common during this age.

On account of the small volume of blood and other tissue fluids only a relatively small amount of free glucose is available to act as buffer to insulin injections. This limits somewhat the range of insulin dosage and increases the danger from insulin shock.

The results presented here are based on a study of thirteen cases treated during the past year in the University Hospital. These comprise a series of six boys ranging in age from four to twelve years and seven girls ranging in age from fifteen months to eleven years. The average duration of the trouble at admission was four months in the boys and nine months in the girls.

The boys were kept under hospital regime and on diabetic treatment an average of seventy-one days; the girls, an average of forty-one days. The interesting fact is noted that the girls yielded more readily to treatment in spite of a longer duration of the disease before admission. The probable ex-

*Presented before the annual meeting of the Minnesota State Medical Association, St. Cloud, October 9, 1924.

planation lies in the fact that girls are more tractable as regards dietetic measures and are less active than boys.

Of the symptoms first noted in these cases the earliest was polyuria. Nine out of thirteen showed this. Polydypsia occurred less frequently. Polyphagia was noted in five out of thirteen cases. Loss of weight and pronounced fatigue was the first symptom noted in four of the thirteen patients. In one case coma in connection with an attack of otitis media was present at the onset. In another, muscular twitchings and choreic movements. Acidosis always was a later symptom and in one case furunculosis. Some of the cases showed gastrointestinal distress and a few had troublesome constipation.

The psychological reactions were somewhat abnormal in most instances. Loneliness, shyness, nervousness, homesickness, and tendency to hysteria were observed in some of the cases; in others a morose disposition developed with marked irritability and crying upon the least provocation.

The family history was singularly negative, certainly as regards diabetic antecedents. In none of the cases were the parents affected with diabetes—active or past; and in only one case a brother had died from the disease. The mother of one case had nocturia but it was not determined whether she passed sugar in the urine.

Tuberculosis was present in the antecedents of another case and one mother had chronic gallbladder infection.

Two of the boys had had no contagious disease and only occasional moderate tonsillar infections. The others had had one or several of the contagious diseases some time preceding the development of diabetes.

The girls all had had either severe infections such as broncho-pneumonia or otitis media or one or several of the contagious diseases preceding the onset of diabetes.

In a number of the cases varicella or vaccination had preceded the onset of diabetic symptoms either immediately or some six months previous. This may have been coincidence and probably has no significance. Most of the patients had fair development but were in poor nutrition and had suffered considerable weight loss. This was not strange in view of the nature of the condition and the difficulty of handling the case in the home and the ignorance of the parents as regards the special dietetic requirements and the general care of a case of diabetes.

The school children of this series made good progress in school.

Eleven of the thirteen children were affected with chronic tonsillar infections.

Diacetic acid and acetone was present in all the cases on admission and the amount of sugar in the urine of a twenty-four hour specimen on the second day of admission shows from 1 to 160 grams of sugar.

Six of the cases received insulin during the first twenty-four hours. In these the average urinary sugar in the second twenty-four hour specimen would not exceed 20 grams.

Seven did not receive insulin in the first twenty-four hours but were on rigid dietetic measures. In those cases the average range of the urinary sugar in the second twenty-four hour specimen was around 40 grams.

The average hemoglobin and red cell count was high in all of the cases. This is doubtless a concentration phenomenon. The very severe forms had a low hemoglobin percentage and a low red cell count. Several of the patients admitted in the pre-coma stage gave a positive Wassermann test which later became negative as the case responded to diabetic treatment.

The nitrogen chemistry of the blood showed occasional high urea and creatinine values but in general was nearly normal.

The blood sugar varied from 200 to 600 milligrams in 100 c.c. of blood. (The normal is from 80 to 120 mgs. per 100 c.c. of blood.)

None of the cases had nephritis and only one showed rather pronounced edema. This cleared up on the second day after admission.

Six of the thirteen cases here reported were admitted to the hospital during the second and third quarter of the year 1923. These were given very little insulin and were placed on an initial fat free diet. With the exception of the use of the small insulin dosage this routine of treatment was equivalent to the underfeeding or starvation method of treatment. The initial diet had a total glucose to total fatty acid ratio of 1 to 0.33. The cases remained in the hospital an average of 86 days and were discharged on a diet having a ratio of 1 gm. total glucose to 1.6 gms. total fatty acid.

The seven later cases admitted since the last quarter of the year 1923 up to the present time were all given adequate insulin dosage and placed on initial diets containing carbohydrate, protein and fat. The ratio of the total glucose to the total fatty acids in the initial diet was 1 to 1.6 and in the diet on discharge was 1 to 1.8. The average duration of the hospital stay of these patients was forty-two days.

The total calories given per kilogram body weight varied from 49 to 104. The amount depends somewhat on the age of the child and its activity. A hundred calories per kilogram body weight should cover the requirement of an infant up to 18 months or two years. From that period to about the fourth year it could range between 70 and 100; from 4 to 12 years between 70 and 50 calories per kilogram body weight.

In planning the diet for the diabetic child it is essential not to overlook certain facts and needs outside of the purpose of establishing a definite sugar tolerance for the organism by the combined use of diet and insulin.

There must be adequate caloric supply to produce gain and there must be enough to cover growth requirement. It is difficult and quite unnecessary to keep the diabetic child confined or absolutely inactive. One must therefore not estimate diets and caloric requirement on the basis of basal metabolism figures alone.

Three of the cases were in a state of coma when admitted to the hospital. The other ten were in what might be called the pre-coma stage.

With very slight modifications, the treatment recommended by Wilder for cases in advanced stages of acidosis or diabetic coma was carried out in all of the cases reported.

Water was given freely. The stomach was washed out with a weak sodium bicarbonate solution and an enema was given to clear out the bowel. If fluids were not taken by mouth, a duodenal tube was passed and left in place. Water and orange juice could then be given easily. The child was put at complete rest, and kept warm with blankets and hot water bottles. Fluids can, of course, be also given by all the other usual routes —rectum, hypodermoclysis or intravenous injection.

Insulin was given in repeated small doses always buffered with carbohydrate in the form of orange juice. (About 5 units of insulin will cover the carbohydrate of 3 ounces of orange juice.) The initial dose of insulin was either 10 or 20 units —or even less—buffered with 3 to 6 ounces of orange juice.

If the patient did not rouse or respond readily or refused fluid or food, the dose was repeated in two hours. If there was definite clinical improvement it was repeated in four hours. Urinary specimens were examined for sugar when passed.

On the second day of admission or after the stage of coma had passed, food was given. The initial diet consisted of carbohydrate, fat and protein. For the patients below ten years from 70 to 100 calories per kgm. body weight were allowed. For those over ten years the caloric need was computed on the basis of Du Bois' table. (By taking the height and weight, get the surface area in square meters. From the table of age and sex get the number of calories required per square meter of body surface. The product of the number of square meters and the number of calories needed per square meter for the age and sex gives the number of calories required.)

The diets in the hospital are all weighed and prepared by competent dieticians.

With the patient on these known diets, twenty-four hour specimens of urine are examined daily for sugar (Benedict's solution for quantitative determination of sugar). If the sugar is present in the urine in small amounts—i. e., below 10 gms.— the diet is readjusted and more fat and less carbohydrate is given.

If sugar is present in larger amounts—10 gms. or over—the insulin dosage is adjusted so as to give one unit of insulin for every 2 gms. of carbohydrate given. (A unit of insulin will generally cover less than 2 gms. of carbohydrate. This allows some leeway and guards somewhat against insulin overdosage.)

In the beginning of the course of treatment, blood sugars are taken in the morning and in the evening and at any time in the course of the treatment when there is any doubt about the true picture of the carbohydrate metabolism. Blood sugars are also always taken before the discharge of the patient.

The diet is gradually increased in calories over the initial diet to the point where the child is satisfied and comfortable and is definitely gaining in weight. This is generally accomplished by increasing the protein and fat component.

If foci of infection were present in the case, they were removed at this stage.

If the amount of insulin required exceeded 30 units per day, an attempt was made to decrease this amount, so as to lessen the expense to the family on discharge of the patient. This was sometimes accomplished by lowering the protein to 1 gm. per kilogram and increasing the fat content of the diet.

We have observed in several of the severe diabetics that they required from two to four times as much insulin if the diet was high in protein—i. e., 2 to 3 gms. protein per kgm.—and lower in fat, the number of total calories remaining the same. The amount of insulin required dropped considerably if the protein was reduced to 1 gm. per kgm. and the fat increased.

During the period of adjustment of the diet, accurate record is kept of the number of units of insulin used daily and the daily amount of glucose in the urine. The glycosuria will either go up or down. This may mean hyperglycemia or hypoglycemia but is not necessarily a true index of the level of the blood sugar. We have observed cases in which glycosuria did not occur even with the blood sugar at a level of 250 mgm. per 100 c.c. The glycosuria does, however, give a fairly good index of the amount of insulin which should be given as the daily dose.

To give an example: If the dosage of insulin for the day were 10 units and the urine for that day showed 10 gms. of glucose, but on the following day with the same dose of insulin showed only a trace and on the following day no sugar, it would indicate that the dose of insulin was larger than necessary and could even prove dangerous. We decrease the insulin dosage by about 2 units daily up to the point where the urine again shows traces of sugar in definite amounts. This will indicate that the dosage of insulin, let us say at 4 units, is now inadequate. The optimum lies somewhere between 10 and 4 units—possibly at 6 or 7 units. No change is made in the diet during the entire observation. The entire procedure is checked with a blood sugar and if the patient is on a rational diet, he is ready for discharge from the hospital.

Before discharge from the hospital, the mother or regular attendant of the patient is carefully instructed in the following things: To prepare seven different diets, each to contain equivalent amounts in grams of carbohydrate, protein and fat. As a guide she is supplied with a text such as Wilder's "Diabetic Primer" or similar book. The mother is present daily, if possible, in the diet kitchen during the last few days or week preceding the discharge of the patient so that she may gain first-hand information about details in preparing the diet. The purchase of a Chatillon Spring Scale or Hanson Spring Scale for weighing out the foods is recommended.

The mother or attendant is instructed to watch for and recognize symptoms of acidosis or hypoglycemia and to know what emergency measures to use. She is instructed in the use of insulin by the hypodermic needle and must obtain two 2 c.c. Luer glass syringes and know how to use them aseptically.

The technique of testing the urine daily for sugar with Benedict's solution is very simple and is easily carried out in the home.

A specimen of urine with a report on the patient's general condition is sent to the hospital at least once a month for an indefinite period.

This routine of treatment and follow-up of the case has so far given us very satisfactory results.

There was only one instance of insulin shock among this series. We were quite fortunate in having few severe or acute infections as complications. These, of course, require special care and much more intensive insulin therapy.

Insulin has proved as great a boon in the treatment of diabetes of childhood as it has in the adult. It stays the rapid and formerly so fatal progress of this disease in childhood. It makes possible the use of a diet so liberal that a child will readily take it and grow and thrive on it. It is an absolutely certain remedy in the prevention of advanced acidosis and coma, which conditions formerly sealed the doom of the child.

The serious drawback to the prolonged use of the remedy is the eventual complete dependence of the diabetic organism upon it and the mounting dosage necessary to meet the metabolic requirements of an organism verging on or in a complete state of diabetes.

The greatest reliance should still be placed on a carefully planned and carried out dietetic regime supplemented with insulin therapy only in emergency or to bridge over a situation which dietetic measures alone cannot master.

The tendency to high fat diet now rather favored in the treatment of the adult diabetic is not quite so promising for the child. Anorexia develops on it more rapidly. The child generally takes such diets poorly. The urine will become free of sugar and acetone bodies more quickly if its ratio to carbohydrate is not so high. In the presence of severe ketonuria or of infection it is surely contraindicated. The somewhat lower antiketogenic-ketogenic ratios seem to give satisfactory results and are recommended for the diet of diabetic children.

The entire field of diabetes both in childhood and adult life has through the discovery of insulin been thrown open to renewed and intensive investigation. Our possibilities in the treatment of this disease are more clearly defined than ever before and likewise our limitations.

PEPTONE SOLUTION FOR HYPODERMATIC USE (ARMOUR) NOT ACCEPTED FOR N. N. R.

Peptone solution for hypodermatic use is marketed by Armour & Co. in ampules containing 1 c.c. of a 5 per cent solution of Armour's Special Beef Peptone. The product is advertised "as an aid in immunization, hypodermatically and orally" and the advertising refers in the main to the firm's peptone solution for hypodermatic injection, although its intravenous use is also dealt with. Emphasis is given to the use of peptone in the treatment of asthma. Reference is also made to its use in such conditions as hay-fever, skin affections associated with asthma, cyclic gastro-intestinal attacks, urticaria, coryza of the spasmodic type, migraine angioneurotic edema and pruritus. Intravenous medication—some wise and some foolish—has greatly increased in recent years, and it is not surprising that foreign proteins should be used in the hope of accomplishing something in conditions such as those for which the Armour preparation is advertised. It is a serious question whether the best interests of medicine are served by the recognition of methods, the real value of which is not established, the limitations and dangers of which are not understood, and the general employment of which contributes to the profits of those who sell the product, rather than to a knowledge of the actual value of the product. For this reason, the Council on Pharmacy and Chemistry voted not to accept Peptone Solution for Hypodermatic Use (Armour) because it is an unstandardized mixture, and because its acceptance would be taken as an endorsement of the use of peptone for intravenous use, presumably for all the conditions in which its employment has been recorded. The Council wishes it understood that, in not accepting this preparation, it has no intention of opposing the legitimate use of protein preparations by those who wish to study nonspecific protein therapy. The Council reports that Armour & Co. appeared willing to undertake the standardization of the protein, but that the rejection of the preparation was affirmed because its value has not been established. *(Journal A. M. A., Nov. 29, 1924, p. 1786.)*

SIGNS OF THE TIMES—THEIR CAUSES AND EFFECT*

W. W. Lewis, M.D., F.A.C.S.
St. Paul

In most countries, other than our own, the breadth of a medical man's practice and his prestige among the laity is largely governed by his standing in his own profession; and in the specialties, particularly, by his reputation for merit among his fellows. It would be especially fortunate for all the people if it were so everywhere, for his indulgence would not be long lived except for merit, soundness and honesty of purpose, under the qualified scrutiny of his own kind.

In some countries of the old world a change or even frequent change of residence from one educational center to another is not unwelcomed by a medical man so long as it is by way of promotion in his capacity as a teacher in educational institutions, for he knows, undeniably, that his practice and clientele is assured by his standing in the scientific world and will be awaiting him in full measure upon his arrival. It is not until he reaches the top in the educational world that he expects or wishes to settle down to an unchangeable residence, and this, of course, is usually in the most desired metropolis, where his fame and success financially, as well as scientifically, can bloom to its utmost. It is not at all unusual to find men of exceptional ability and renown as teachers who have kept working places in government clinics for ten, fifteen, or more years, putting in the best hours of the day for a mere pittance of salary and attending their private practices at early and late spare hours, for they know only too well that fame and fortune depend entirely upon their standing in the educational world and among their professional fellows.

In this glorious country of ours, though young and blasé, where nothing succeeds like success, cheek and bluff not only take a great handicap at the start, but seem to be able to go on and on without hindrance. But this can not long endure. Just as sure as water finds its level, so will the fittest and best survive in medicine, as life's struggle increases with density of population. The standards of medical education and requirements from graduates entering practice, constantly being ele-

*President's Address, Minnesota Academy of Ophthalmology and Oto-Laryngology, Minneapolis, Oct. 10, 1924.

vated as they are, in the form of compulsory interneship, serving of fellowships in the specialties, and special preparation before recognition is accorded them, will gradually eliminate the incompetent and safeguard the community.

In the mad rush for dollars, medicine has not escaped, and for a time, at least, and especially since the war, a medical man's success seems to have been computed solely in figures of his income. Commercialism has had full sway.

The time is close at hand, I believe, when such success alone will not be accepted as success, and where only meritorious endorsement and acknowledgment by one's fellows in the profession will count in the career of a medical man.

Not long ago an article was written entitled, "Why Has the Medical Profession Lost the Position It Once Held in the Esteem of the Public?" which caused an unusual uproar at home and abroad, but which at heart was well understood by all thinking men in medicine. The fact is that its truth hurt, and it seemed easier to bear by trying to persuade ourselves that it was not true.

One of our societies, endeavoring to sustain our prestige before the world, requires of applicants for membership a pledge to abstain from dividing fees with other physicians. It could have well, and with benefit, included the clause, "nor will I be interested in the receipts of druggists, undertakers or opticians."

I know of a man who takes personal jewelry from patients as security for his fees. Is it any wonder that we are losing caste with the people when it is a well known fact that our specialty has become extensively tainted with commercialism in splitting fees with tradesmen, and tradesmen, too, whose profits are inordinately out of proportion to the average profits of men in usual lines of business? A business that can afford to pay commissions of 40 per cent of the cost price of articles sold, and still have abundant profit left for itself, can surely be included in the bonanza class. The growth and multiplication of optical houses and opticians' stalls throughout the length and breadth of the land attest conclusively to the very profitable business that it has become.

The most demoralizing and compromising sins of the human kind are secret sins, and the secret split between the oculist and the optician is no exception. Let the man who challenges this statement answer just one question: Is he willing for his patients to know that he is receiving part of the cost price of the glasses after being paid in full for his services?

Nor is the association in any form between oculist and optician dignified or becoming to the professional man, whether it be with the optician's shop down the street or with one maintained in connection with the oculist's office. In the latter, the claim can be made that it is advantageous to the patient, but it is a very universally accepted belief that the advantage is to the oculist alone, and that advantage a financial one almost entirely. Although this commercialism is in the open and not secretly conducted, it is nevertheless quite compromising. It has the appearance of a diminutive department store, and that is the impression left upon the minds of alert and thinking people.

The oculist who is obliged to dispense his own glasses, who has not the services of a competent optician at hand, and who has to fit the glasses himself and has to pay for the glasses he orders, whether in turn he is able to collect for his services or not, surely does not come under this criticism and is entitled to what he gets.

The vast majority of opticians are incompetent when measured as to scientific preparation, many being promoted from the store errand boy, with no subsequent or additional education; and when compared with the few outstanding competent men in our midst there is emphasized the necessity for constant vigilance on the part of the oculist to safeguard his patients against their mistakes.

The chief offenders in this clandestine traffic are the wholesale opticians, and their present desperate competition is the result of their double dealing with the small retail optician whom they have led to invest extensively in paraphernalia while at the same time they have endeavored to strip him of his prescription business by playing direct with the oculist for his prescriptions on a split basis. The quality of work of these wholesale houses is of the mail-order stamp, quantity and not quality. Instead of being moulded to the patient's face, the fit of his glasses is like a loose halter on a frisky mule in the barnyard. The most careful work of a careful oculist can thus be made to count for naught. This is the type of work generally produced by the commission-paying optical house, and it is difficult to see how any man with pride in his work can risk its being entirely undone by such workmanship.

The scientific optician, on the other hand, when truly worthy of the name, as Edward Jackson points out, has a long lineage of learned and skillful workers to whom he can trace the knowledge and skill that he has mastered and employs. He has earned and deserves a dignity in which the ambitious but superficially prepared optometrist can have no part.

We need make no apology whatever in elaborating upon this compromising relation between oculist and optician. One of the important matters of discussion before the ophthalmological section of the American Medical Association during the June meeting was this very subject; deprecating the sale of glasses by oculists in communities where competent dispensing opticians are available, and resulting in a stinging resolution declaring that the acceptance of commissions or other considerations, directly or indirectly, from opticians or optical houses, from the sale of glasses, is contrary to all medical ethics, and as reprehensible as splitting fees. The committee report denounced the acceptance of commissions in strong language, declaring it to be pernicious and reprehensible and underhanded. The same resolution was adopted by the American Ophthalmological Society. A committee, of which Derby was chairman, stated that there is at least 100 per cent net profit in the glass business. No wonder the street-car advertising campaign is extensively carried on in the hope of getting all the populace to put on glasses.

In reality, false pretense can be openly charged in sending patients to the wholesale house, for frequently they are led to believe that they are going there for the benefit of the wholesale price, when in reality the oculist, acting as a paid decoy, is getting the margin above the wholesale price, and the patient pays practically the usual retail price charged anywhere and everywhere. How can a self-respecting professional man look into the face of his patient and do such a thing?

The Derby report states that such men are dishonest and should be barred from all honorary societies.

A physician's investments are his private affair, and in general he would not welcome promiscuous scrutiny of his holdings. It is annoying, but nevertheless it is true, that representatives of optical houses, in their campaign for business, carry lists of oculists who are stockholders in the various optical concerns and display them, too, to prove what influences these men to send their work to other competitive houses.

Such association is not conducive to dictation and control by the oculists, and very often poor people, timid by nature, are given most extravagant and expensive mountings where they can ill afford to pay for such.

The average oculist is unfamiliar with the problems of the optician, but should thoroughly familiarize himself with them so as to be in a position to criticize his work.

It is not generally known how active and influential this optical industry is. Health talks by accepted men are being thrown out of the papers as the result of criticism of the opticians. I believe Dr. Brady, at a meeting somewhere in the East, said that his article on cycloplegia had resulted in his health service being excluded from some papers.

The profession had better settle down to supporting strictly dispensing opticians. The better class of people are rapidly choosing such for themselves as the superior type.

The inclination and impetus given to group medicine has been largely the outcome of specialism co-operation in the base hospitals of the army, and to many of us returning to private practice it seemed almost indispensable after enjoying its advantages during our stay in the service. There, where we were all common workers for Uncle Sam, striving to do the best for the good of our comrade patients, divorced from the temptations of Mammon and covetousness, and with only the wholesome competitive spirit of outshining the other fellow in the eyes of our associates, its operation was ideal and complete. In private practice, however, many of its advantages are shorn from it. In many instances, selfishness, greed and commercialism, both in the groups and outside in opposition to the groups, have done much to nullify its ideal operation. Old associations have been cleaved as a matter of business policy. Former consultants of choice are no longer available in the lineup of interests, and the cordial fraternalism of former days is chilled to the tragic detriment of the local profession in many communities.

In practicing the specialties, the all-dependent, intimate and devoted relationship between physician and patient that the family doctor enjoyed in years past is tremendously upset and comparatively unknown except to those of us who have practiced as general and family physicians; and the thought

has often come to me, Do we practice surgery among these comparative strangers, one might even say transients, according to the good old golden rule that we used to apply in recommending surgery to our families in general practice?

Especially is this question applicable in considering our nose and throat work. Shambaugh, of Chicago, whom we all respect, has written that in his opinion 60 per cent of septum operations performed are unnecessary, and that much of the nasal sinus work done would better be left undone.

Then, too, in tonsil work in children, in this day and age when children are brought to us really for no other reason than that "the child next door has had his tonsils out," do we consider carefully enough before summarily scheduling them for surgery the next day? Tonsillectomy in adults is generally rationally indicated before it is done, because the adult knows that there is something the matter with him that may justify it. But in children, coming before us largely because of the present popular tendency, the indication should be unmistakable rather than routinely agreed upon. If the little people before us were our own children, would we demand tonsillectomy? If the answer is yes, then let us go ahead, but not otherwise.

The mastoid operation, too, in the early stages of middle-ear inflammation, may look immediately necessary when experience shows us that fully a majority of such cases, with even many of the cardinal symptoms, recede and fully resolve in the regular course of the malady. Occasionally, we get into trouble by waiting, but not often, and the alert, well-grounded and capable man need not be rushed into needless surgery.

Men in special work from the time of their graduation seldom have the large and general perspective in diagnosis, and are slow to accept or even think of the condition before them as being attributable to anything outside of their specialty. It is a misfortune that all men in our line have not the advantages and benefits of several years of general medicine and surgery; and especially is it a misfortune for the patient if his specialist attendant is not the one inclined to call to his aid the internist, the surgical pathologist, and the laboratory expert. De Schweinitz, in a paper of a year or two ago, covered this aspect of the matter very admirably under the title of "Specialism and Co-operation."

The eye, ear, nose and throat man with many years' experience in the general field of medicine makes observation of the patient before him that often carries the patient immediately out of his charge and results in prompt reference to men in other fields. And I know of no more favorable impression that can be made upon a patient, or anything that is appreciated more, than for a man of our specialty to recognize and divert the case to the proper department in medicine. Usually, such patients are the ones that follow him for years for advice in selecting consultants in all branches of our profession.

A matter that is largely under discussion by all medical bodies at this time is the advisability of systematic radio talks. This matter must be approached very carefully and speakers selected with the greatest care, for the feeling of affection once felt for the old family doctor no longer obtains, and the trend of commercialism in medicine may lead to the suspicion of exploitation of themselves by such means. All such discourse, however, must be strictly constructive and not argumentative, for such disposition leads to embitterment. All such speakers should be chosen and instructed by our societies.

Our popularity with the masses must come from our largeness and magnanimity of character, from patience and tolerance, charity and sympathy, and freedom from greed and selfishness. In the practice of medicine, as in no other profession except the clergy only, must we be our client's friend as well as his physician.

The idea of trying to eliminate abuse of free service by organization action is wrong and appears to the public as if we are solely striving to insure our selfish financial ends. Individual action is preferable in declining to give free service where patients are not entitled to it.

We must avoid appearances of trying to monopolize state institution aid except as our merit will bring of itself this monopoly.

So far as getting legislative co-operation is concerned, I think our experience in connection with the attempted basic medical practice legislation has determined us never again to submit ourselves to such abuse and indignity. Any sympathetic and friendly consideration that we may get from the legislature will not come as the result of antagonism and opposition toward others, but rather as the result of initiative in new and universally beneficial legislation sought for.

Our medical schools should exercise greater care in accepting applicants for medical education; and we, in extending membership in our societies. We must make every man feel that unless he earns the regard of his fellows for merit, soundness and honesty of purpose, he must remain outside the fold; that financial success without the foregoing will prove only an empty, hollow accomplishment, abhorrent in the eyes of all. If we hold to these standards strenuously, the laity will soon follow our lead in accepting medical attendance as they do in the old countries.

The present general outlook and sign of the times as applied to medicine—and in these days it means the specialties—is stormy and troubled. We are beset on all sides and in our midst by grave dangers, mostly of our own making and our own fault. We have followed false gods and must retrace our steps. The detour has proved unsafe, and we must get back to the old road. If we do not, state medicine will be the mire in which we shall find ourselves stalled and helpless. We must benefit by the experience of our elders, in this instance the countries of the old world, for their position in many ways will be our position in time to come. Standards of judgment must be safe standards, tried and sure, and the laity will eventually learn to accept the qualified guidance and direction of the profession in selecting their medical attendants. When they do, survival of the fittest will prevail, and only those of merit, soundness and honesty of purpose will be considered or receive recognition by their fellows.

For this reason, it behooves all men, and especially the young men in our specialty, to seek participation in the service of our public and charity hospitals and dispensaries. In such service, more than in any other way, is merit and ability observed by one's fellow practitioners. On the other hand, in no surer way can a man hide his ability, no matter how exceptional, than by keeping tightly to himself in his own private practice. Surely, one's career is not complete, nor should it be at all satisfying to the most modest and retiring, without having had a service of many years in our public and charity hospitals and dispensaries. The most enduring and ever helpful friends I have are the ones I have toiled with in such service.

Affiliation in teaching capacity in our medical schools, too, should be indefatigably sought by all young men of our specialty. Nothing can so warm one up to study and effort as brushing up in preparation for instruction of students assigned to his class. Getting a new and different assignment of subjects each year is the greatest rejuvenation I know of, and can keep one awake after the evening meal better than anything else. Good instructors and earnest workers are always in demand and are always welcomed.

Constant attendance and participation in our society meetings will be the rule, and we will learn to work and strive for the regard and respect and admiration of our fellows, which will set the final grand standard, as in countries of the old world, of safety and endurance, and get us back on the old road of public esteem.

WHY TUCKER'S ASTHMA SPECIFIC?

For some years there has been put out from Mount Gilead, Ohio, a nostrum known as "Tucker's Asthma Specific." The nostrum, which is sold on the mail order plan, declares on the label the presence of 5 grains of cocain to the fluidounce. It has been analyzed at various times and substantial amounts of cocain have been found. A case of cocain poisoning from the preparation has been reported. The nostrum has been declared unsalable in the State of Massachusetts because of its cocain content. In 1910, the U. S. Department of Agriculture issued a bulletin of "Habit-Forming Agents" in which a warning against the Tucker preparation was included. To learn how the Tucker concern can send out a cocain-containing mixture without violating the Harrison Narcotic Law, an inquiry was sent to Washington. The Commissioner of Internal Revenue replied that, while Tucker's Asthma Specific carried a label admitting the presence of cocain, the facts were that before the remedy reached the public, the cocain became hydrolyzed and there was either no cocain or but an infinitesimal quantity. The Commissioner also declared that the mail-order distribution served "a great humanitarian cause" and, therefore, it had been decided by the Treasury Department to take no action enjoining its distribution. Further correspondence brought the statement that samples of the Tucker Remedy taken on the market, when analyzed, showed either no cocain as such, or not to exceed one-half grain to the fluidounce. Even if one admits the "humanitarian" motives of the exploiters of this "quack medicine" and the various other claims made by the Treasury Department, the fact still remains that the sale of the Tucker remedy seems to be an obvious violation of at least one federal law. If it contains no cocain, then it is misbranded. If it contains cocain or a derivative of cocain, then its sale violates the Harrison Narcotic Law. *(Journal A. M. A., Nov. 1, 1924, p. 1435.)*

THE MEDICAL ASPECTS OF BEHAVIOR PROBLEMS IN CHILDREN

LAWSON G. LOWREY, A.M., M.D.
Director, Demonstration Clinic No. 2, The National Committee for Mental Hygiene
Minneapolis

Problems in human behavior may be approached from many environmental and personal angles, and workers in many different fields have a great interest in the topic. Thus, there are problems in education, in morals and religion, in general social relationships, in law, in psychology and in medicine, and workers in each of these fields have varying methods of approach to the problems involved. In the medical field the psychiatrists have rather led in the attack upon behavior problems in general, since after all they come into contact with patients because of some alteration in behavior which leads to a suspicion of mental unsoundness. So far as the behavior of children is concerned, the pediatricians have had a superior opportunity which they have met in varying ways and with varying degrees of success. It seems to us that the pediatricians in the Twin Cities are very alert to this problem and have a great interest in the evolution of methods.

The interest of the psychiatrist in problems of child behavior is not a new thing, since they have being doing a great deal of work in the field for many years, but organized attack upon these problems from the psychiatric standpoint is a relatively new development. This attack, as exemplified in a clinic such as ours, is a matter of the co-ordination of several types of expert study of the problems involved, and the organization includes psychiatrists, psychologists and social workers. Through special arrangements with hospitals and physicians, provision is made for several types of specialized medical study which are necessary in various cases. It is necessary also to establish very close relations with the various social service organizations, the courts, the school system, religious organizations, and the various types of recreational activity available. This permits a study of all aspects of the child's life in relationship to the behavior shown, and a manipulation of all the stresses found to bear a part in the production of the behavior so far as we have methods for the manipulation of such stresses. This all around attack is, in our experience, superior to any approach from any single point of view, no matter what this may be. In it we follow a central idea, by no means novel, that behavior of any sort, whether socially acceptable or unacceptable, whether making for success or non-success, is an expression of a series of adjustments between the reactive capacities of the individual, whether these be inherited or acquired, and the varying situations to which reaction must be made. It follows that we can have no idea that all behavior disorders are dependent upon a single cause of any sort. Indeed, all experience points to the very opposite,—i. e., that a behavior disorder has multiple causes, some internal and some external. Furthermore, this matter may be epitomized as follows: a behavior disorder is always in some way an expression of a discrepancy between the individual's power of reaction and the demands of the situations to which he must react. Such an attitude seems to offer the only scientific approach to the problem.

The medical aspects of the problem lie in the inabilities of the individual to react, and such disabilities may occur in either the physical or mental fields, to use a distinction which is hardly valid. Many of the mental disabilities lie in a borderline field such that they are claimed for psychology and for psychiatry. It seems to us useless to argue about the proper placing of these points, and far better to deal with them jointly, as may be done with great profit.

Bearing these points in mind, it has seemed worth while to present some analysis from our experience of the past year with cases drawn from the Twin Cities in the course of our demonstration. This demonstration situation has been unique and extraordinarily complicated and has been followed by the establishment of three clinics: one for Minneapolis under the direction of Dr. Smiley Blanton, located at Lymanhurst Hospital school; one for St. Paul under the direction of Dr. M. L. Stiffler, located at the Amherst H. Wilder Dispensary; and one at the University for the State at large, under the direction of Dr. George S. Stevenson.

ANALYSIS OF CASES

The clinic was engaged in active case work for ten months, during which time it accepted 610 cases for study, of which 77 were withdrawn for one reason or another, leaving 533 cases worked on. Of these, 359 were Minneapolis cases, 146 St.

Paul and 28 out-of-town. From this number of cases, various samples have been drawn out to show something of the variegated nature of the case material. It seems best to discuss these in orderly fashion in relation to the type of medical problem presented. Solely for convenience, the medical problems have been divided into the general medical and the psychiatric groups. This is at best a highly artificial type of distinction, since there is so frequently a subtle interweaving of physical and mental problems.

1. *General Medical Problems.*—The routine study of a case includes a complete physical examination and urine analysis, with Wassermann tests done on all cases where it is thought desirable. It was impossible, and perhaps unnecessary, to have the Wassermann done as a part of the routine examination. Any special conditions found or suspected were then referred to the proper department of the University dispensary, to certain physicians who made special studies for us, to hospitals, or back to the family or referring physician. For the most part treatment of conditions found was then carried out by the physician to whom the case was referred. In order to ascertain something of the relative frequency of various conditions, we have analyzed the refers and treatment recommendations in an unselected series of 200 cases, and the results follow:

In 19 cases no medical recommendations of any kind were made. That is to say, in 9.5 per cent of these cases, no conditions demanding further medical study or treatment were to be found. Of course, in some other cases studied from some special viewpoint, the results were negative and no actual treatment was finally found to be indicated.

The special studies requested were as follows: Wassermann, 54; spinal fluid, 8; blood count, 7; sugar tolerance, 6; roentgenograms, 20 (in 16 of ductless glands which can be so studied); complete endocrine study (kindly done for us by Dr. Henry Ulrich), 18; basal metabolism alone, 14; medical consultation for definite endocrine disorder, 6; hospitalization, 9; refraction and other examinations of the eye, 28; fatigue study, 2; heart study, 6; dermatological, 4; neurological, 1; general study, 3; nose and throat, 34; ear, 9; hernia, 3; genito-urinary, 10; gynecological, 5; orthopedic, 4.

In this same group, our records show the following treatment measures carried out: general hygienic measures (rest, sleep, exercise, dietary regulation), 68; removal of tonsils and adenoids, 34; enuresis regimen, 9; epileptic regimen or luminal, 6; for chorea, 2; antiluetic, 2; for anemia, 3; hydrotherapy, 2; endocrine therapy, 25.

It will be seen from this tabulation that a large number of medical disorders came into view in connection with this group of cases. Probably a complete survey of all the cases would show a still larger variety and would change the relative distributions but this will serve to give some idea of the number and importance of the conditions found. This survey is enough to emphasize the oft repeated point that biological soundness is extremely important from the standpoint of the behavior of the organism. Biological unsoundness may produce direct effects in behavior, but more commonly the behavior is a result of the reaction of the individual to the limitations in activity produced by the limiting process. This is an excellent example of the effect of a discrepancy between the individual's capacity to react and the situations to which he must react, and here the limitation of capacity is the direct result of organic processes of one sort or other.

Some of these matters are worthy of further elaboration. For the most part, the conditions tabulated produce their effects in the limitation of activity in some secondary way. Perhaps this point is most clearly shown in the cases in which the behavior is primarily the result of *fatigue*, and the fatigue in turn is due to a combination of causes including often several physical causes.

We have long known that fatigue produces various changes in mental attitudes and reactions, the commonest being an increased irritability. In children this increased irritability is often expressed in overactivity of various kinds, including ordinary types of restlessness, inability to concentrate, a constant darting from one thing to another, quarrelling, disobedience in various forms, stubbornness, insomnia, lack of appetite, and a form of activity which often leads the parent to feel that fatigue could not possibly produce the situation. Dr. Max Seham has made a careful and exhaustive study of the fatigue problem, and very kindly reviewed for us a series of 16 cases in which we thought this problem especially important. For these he prescribed the indicated forms of medical treatment, as well as the special measures which lead to a decrease in the fatigue manifestations.

In a considerable additional series of cases we made use of the schedule provided by Dr. Seham as a means of combating and preventing fatigue.

Many conditions can contribute to the production of excessive fatigue. Tonsils and adenoids, infections, acute and chronic, and various types of endocrine disorder come at once to mind. In addition there are many more subtle questions of fundamental constitution, of which the asthenic type (of uncertain origin) is the outstanding example; of malnutrition and of the emotional pressures engendered in various ways in the home. Sometimes all or several of these are combined in a peculiarly vicious set-up which is most difficult to combat. Needless to say, for lasting results every element in the situation must be reached. To do so involves, first of all, the correction of such physical disorders as are present and treatable. Then comes the erection of a schedule of activities which will be carried out, including diet, rest and exercise. The most difficult and time consuming job is the correction of attitudes within the home and the erection of a rational scheme for meeting the problems presented. Often, as in other types of case, this involves psychiatric or medical treatment of some important member or members of the family, as well as the direct treatment of the child. In this phase of the work, time and patience are the great desiderata. The resulting changes in behavior when the fatigue problem is adequately met are little short of marvelous and are extremely satisfying both to parent and physician. In some of our simpler cases we have had excellent results from nothing more than the introduction of a rest period in the middle of the afternoon. With this increased amount of rest there comes, often to the parent's great surprise, an increase in the amount of sleep at night, an increase in appetite and gain in weight from the additional food consumed and lessened energy demands, a lessening of the restlessness, irritability and an increased power for sustained attention. The more complicated cases are necessarily more difficult, but if the problem is thoroughly understood, and an adequate schedule carried out with good co-operation, the results are again excellent.

While not exactly germane to the subject, it should be pointed out that *overstimulation* of children, with resulting overfatigue and extravagant behavior related to this, is a thing very difficult to avoid in our modern type of life. When to this is added the aspirations of an overambitious parent or the competition of a group of children with which the child can under no circumstances compete, a situation is created which is pernicious in the extreme.

Sometimes in relation to fatigue, but more commonly because of the direct effects upon the capacity of the individual to react, the *endocrine disorders* loom up as a tremendously impressive problem. There are so many ways in which the ductless glands are of importance in the biological processes of the individual, and so little is definitely known about these, that we have adopted a very conservative attitude. This means that in all cases suspected of endocrine disorder we try to get a thorough study according to modern methods, with treatment as indicated by such study. Dr. Henry Ulrich has carried on this work for us, and has seen a total of twenty cases. There were other cases in which the diagnosis was obvious, or which were already under treatment, not seen by him. At this time there is nothing we can report regarding the effects of such treatment, aside from that already known. In the last analysis, what will happen to the behavior of the individual so affected depends in large part upon how adequately we can meet the medical problem involved. There is, however, also an environmental element always present which needs to be met in one way or another. This may only involve adequate explanation to parents of the situation, and securing their co-operation, or it may be much more intricate.

One of the most interesting endocrine cases seen was that of a boy of fourteen whose facies and bony development suggested acromegaly. Roentgenograms revealed an enlargement of the pituitary and findings in the long bones which the roentgenologist reported as typical for acromegaly. So far as we can find, the occurrence of typical acromegalic changes before the ossification of the bones is complete is extremely rare. Apparently the changes which occur in gigantism are of different type.

Two cases of pubertas precox were encountered. One was in a girl not quite ten years of age, whose general physical development as measured by height and weight and general measurements was about that of a thirteen year old. Her mental age was fourteen years one month, and pubertal changes were well advanced. Her interests are all directed to the bearing of children and the estab-

lishment of a family of her own. Presumably such accelerations in the orderly processes of growth and development are of endocrine nature. In this case there was no evidence permitting a diagnosis of endocrine disorder, and the case is only mentioned for the sake of completeness.

The other case is that of a girl of nine and one-third years, referred to the clinic because of sex interests, talk and experiences, lying and running away. She showed very definite signs of puberty, which had been in evidence for nearly two years. She showed a fat distribution typical of the hypopituitary type and a marked hydrocephalus. The mental age of seven years ten months indicated retarded intelligence development. She was referred to the General Hospital, where a most careful study was made to determine the origin of the difficulty. By this it was possible to rule out the ovaries and pituitary as causative factors; the adrenal and pineal were also excluded, but with somewhat less certainty. The disorder in this case is, therefore, a complex one, and presumably several glands are involved. Syphilis was also ruled out. In the absence of any definite indications, it was not thought wise to try gland therapy. In view of all the factors, including those in the home, it seemed best to recommend institutional care and training as representing the best available means of reaching the girl's problem.

There is evidence to the effect that the asthenic constitution is related to a failure of involution of the thymus gland, but this point is in dispute. We had special examinations made for thymus enlargement in four cases of this type, but in all no positive evidence could be secured.

With the basic problems of endocrine function no better understood than they are at present, it seems impossible to answer many questions which confront us daily concerning the relationships between the functioning of these glands and the behavior of the individual. This accordingly becomes an extremely important research field.

The problem of *congenital syphilis* is not an important one in our group of cases. Wassermann tests done on 108 cases showed 105 negative, one negative and then positive and one positive and then negative. Two other children from one family were known to have congenital syphilis, so that at the most (provided all cases were tested in which a test was indicated) less than 1 per cent of this group were affected. This experience is decidedly different from that of a general psychiatric practice, but is in line with the changes observed by pediatricians in the character of their practice.

The other medical problems did not engage our special attention as groups. As it happens, their effects on behavior and the results of treatment are well known, though sometimes exaggerated, and it seems unnecessary to go further into detail.

2. *Psychiatric Problems.*—All types of psychiatric problems were encountered, ranging from the fully developed psychosis or psychoneurosis to types of alteration from the norm which are very difficult to diagnose. For the most part we have not given psychiatric diagnoses of the ordinary sort, preferring to consider the mental abilities and disabilities of the individual in their elements and deal with each as we could rather than consider the massed product of these more elemental situations. It seems desirable, however, to discuss some of these problems in relation to the usual groupings.

The number of actually *psychotic* seen was small. This is related to the low incidence of psychoses in children and to the fact that when a psychosis is developed the alterations in behavior are usually such that the need for treatment is obvious and the patient at once becomes a medical problem. This is not true with the run of our cases. In many cases there was an alteration of personality such that a pre-psychotic stage seemed evident, but these are included with the psychopathic personalities.

The number of *feebleminded* was also small, representing only 13.8 per cent of the cases. An additional 14.9 per cent were borderline in intelligence, so that not quite 29 per cent belong in the group of inferior intelligence. This number may not seem small, but in view of the sometimes expressed view that all problems in delinquency are related to feeblemindedness, the smallness is emphasized. As it happens, surveys of the intelligence of the inmates of penal institutions have given practically the same curve of distribution of intelligence as was obtained in the army draft. It must be remembered that our cases were not drawn solely or even largely from the delinquents; indeed, only 7 per cent of our cases were referred directly from the courts, though nearly 15 per cent had a court record. On the other end of the scale, that is in the group with *superior intelligence*, we find 16 per cent of our cases, leaving 55 per cent in the *average* group.

In connection with the foregoing groups comes up the question of *heredity*. The statement has been made that delinquency is a matter of the inheritance of character, and that our problem children would belong to a group of very poor heredity. We have analyzed for 200 unselected cases the occurrence of mental disease, feeblemindedness, epilepsy, neuroses, psychopathy and delinquency in other members of the family. In this analysis the occurrence of these conditions was noted for each family. Accordingly, if each family showed each of these things, we would have a total of 1,200 entries, whereas we find a total of 307 entries as follows:

Mental disease	38	19 %
Feeblemindedness	17	8.5%
Epilepsy	34	17 %
Neuroses	48	24 %
Psychopathy	66	33 %
Delinquency 104		52 %

These figures are open to some question, since it is always difficult to get reliable facts from which to draw conclusions. This is especially true in case a history has to be taken from a feebleminded member of a family, but we usually know at least that that one individual is defective. However, no absolute accuracy is claimed for these figures; they are simply indicators that behavior problems occur in families of good heredity and bad heredity, just as they occur in families where there is much delinquency or no delinquency, good religious standards or poor religious standards, and good economic status or poor economic status.

No one of these factors is in itself sufficiently outstanding to justify any sweeping conclusion, nor would the number of cases justify it. They seem to show a tendency for the greater occurrence of disturbing behavior in families where there is evidence, in the personality makeup or behavior, of a mental instability in the stock, than in families where this is not true. It is very difficult, however, to relate these figures to the whole mass of the population.

The *neuroses* of children seem to be increasingly important. It is not at once evident why this is true. Perhaps it is only a matter of their greater recognition, but the fact remains that the pediatricians are finding it a more and more important problem. Our experience bears this out. Neurotic manifestations of various sorts may be found in children of all ages. The behavior related to these neurotic mechanisms may be of the same sort as behavior related to other causes. The treatment does not differ a great deal from the neuroses of adults. Indeed the problem of the neurotic child is frequently the problem of the neurotic parent, and the first task is, by treatment of the adult neurotic, to free the child from the pressure exerted by this parent. All sorts of neurotic fears are set up in children under such conditions: the fear of disease, the constant evolution of symptoms of physical disorder, fears of the dark and imaginary forces, aches and pains, and so on through a ghastly list, all become real things handicapping the child in various ways. Thus, an absolutely healthy boy, so far as the most careful of examinations made by several good men could determine, was a typical hypochondriac, afraid to venture forth in cold or stormy weather, extremely solicitous of his diet, with constant aches and pains, etc. Here the mother was responsible for the development and continuation of his fears. Among other things, she took his temperature daily, and the slightest rise was sufficient to cause her to keep him in bed and send for the doctor. Another five-year-old boy was constantly threatened with the "bogey-man" who would carry him off and throw him in a great pit. He was terrified by this threat, and constant repetition, instead of making him contemptuous of it, only increased his terror. Every time he went to sleep, whether during the day or at night, he would have a nightmare in which he shrieked and clutched wildly at his crib. The content of his dream, which was gotten without difficulty, is quite significant. He always dreamed that the bogey-man had him and was throwing him down the pit. It was during the fall that he screamed and tried to save himself. This obsessive fear was, therefore, always with him, and interfered in all his adjustments to life.

In another case a girl of twelve had been carried for several years in sight-saving classes because of a "blindness." Refraction at various times gave varying results. The analysis here, reduced to very sketchy terms, was that the girl had a great sense of identification with her father who was killed in the war. This was greatly contributed to by the mother, who constantly emphasized to the girl her great resemblance to the father. The father had had episodic headaches for years, following an accidental injury to the occiput. A

slight injury in the same place had occurred to the girl. Further, her father had a visual error. In addition to all this emotional load, the girl had not had an easy time in receiving the attention at school she had at home. In the sight-saving class, she was of assistance to other pupils, and so was not overcome by any sense of inferiority. Significantly enough, she had a continuous headache from Monday morning to Saturday morning. By treatment of the girl, arrangement with the school, and change of the mother's attitude, this girl was gotten into regular class, where she has ever since continued with A grades in reading, the subject most difficult for those with poor vision.

Sleep walking, night terrors, extravagant behavior of various sorts, enuresis, fainting spells, temper tantrums, fears, seclusiveness, and other reactions may have a neurotic basis.

There are also many other mechanisms which belong to this group, though the type of behavior produced is not particularly of the sort commonly related to the neurotic mechanisms. Perhaps the most important of these is the inferiority complex. A certain sense of inferiority is a fine stabilizer of personality, but it can develop to a point where it becomes a very real handicap. This mechanism is particularly important in relation to fixed handicaps of one kind or other which interfere with the competitive equality or superiority of the child. Thus the child of inferior intelligence who has to compete in school with children of normal intelligence, and finds himself unable to do so, is quite apt to show behavior difficulties directly related to this. He is apt to become over-active, pugnacious, truant, and by fighting, lying, truancy and stealing attempt to set himself up as superior to the group, at least as a "hard guy." It has been our experience time and again that such a boy, when put into an educational group with which he can compete, and on subjects (such as manual training) which he is competent to do, ceases to be a behavior problem and becomes a quiet, fairly stable and interested individual. Similarly, the Jewish boy who is constantly taunted by his Gentile neighbors is apt to react extravagantly to this attempt to force an inferiority on him. In several such instances, the Jewish boy found he could buy his way to favor, and, the money not forthcoming in any other way, resorted to stealing. The money thus procured was always spent on other boys.

An outstanding case of the compensation by disturbing behavior to the feeling of inferiority, this time based on an actual inferiority, was that of a boy who is permanently crippled by infantile paralysis. It was noted as a significant point that all of the gains from his stealing were spent upon other boys, usually upon some one boy who was then his friend. His own statement was: "You see I couldn't run and play with the other boys and I found they didn't much care to have me around. But if I had money, it seemed I could always have companionship." He was fully cognizant of the wrongness of his acts, and felt that "I must have been a weak fool to do it," yet no constructive plan to permit him to have the companionship he required had ever been evolved, and he himself had neither the knowledge nor the experience to evolve a better plan than the one he chose.

States of overactivity bordering on hypomania and commonly diagnosed as hyperkinetic type of psychopathic personality not infrequently turn out to be based on the inferiority complex. The mechanism works in somewhat this way: the compensation in behavior is, as usual, an overcompensation, which fails of its effect. Not only that, but great opposition is aroused by the behavior. This behavior is of the type which is usually increased by active opposition, since there is an emotional tone of resentment connected with the complex and the behavior drive. In time, therefore, the overcompensation (or, more simply, the compensation) becomes extreme and we have this hyperkinetic state.

Apparently this matter of the feeling of inferiority and the necessity for establishing one's self as an independent individual has many subtle connotations in ordinary family life. That this is directly related to the development of the Oedipus complex, which in a certain degree of strength is absolutely necessary to the establishment of a healthy existence independent of the parental influence, is unquestionably true. The difference in behavior seen in children of different ages and emotional settings in the family cannot be accounted for by such an easy formula as inheritance. Children of the same sex and nearly the same age in different families show a tendency to react similarly and this reaction in the younger children is as nearly as possible the opposite of the behavior of the elder children who in turn show very similar behavior from family to family. This tendency is so strong that we can ordinarily tell, from the behavior of the child, what his position in the family

is. There are here many points worthy of further study and analysis, which must be reserved.

The only child is particularly apt to be quite neurotic in trend. Here there is overstimulation from the adults, a great emotional load from the adults sustained by only this one individual, a lack of socialization in the group with which he must compete, leading to the development of difficult personality traits and oddities of behavior in practically all such cases.

Of the many other situations which contribute very markedly to the development of the neurotic trend, there are only two which need further mention. One is the broken home as a setting for the development of the child. Wherever one parent is continuously absent from the home, either by death or divorce, the child is again apt to be overcome by an emotional burden. The situation is even more serious when the parents still live together, but one parent consciously or unconsciously rejects the other, and throws the full emotional load upon the child. This happens far more frequently than is generally realized. Where one parent expends a full load of hatred upon the child, a difficult situation is also set up. We have several records of this sort. In one case, a very intelligent, forceful man is carrying through life a father hatred which affects only his relations with his son, to whom he has transferred much of this original father hatred. This is not some abstruse attempt to analyze his activities, but is a straightforward deduction from the man's own account of his relations with his father and with his son. In another instance, a very psychopathic man, with great interest in religious activities and boys' work, has had a tremendous struggle in adjusting himself to the marriage relationship. He is almost insanely jealous and suspicious. He hates his daughter and is unwilling or unable to deal with her in any way other than by force. She is, quite naturally, rebellious about this, and has come to be what is called incorrigible. A serious neurotic conflict in the mother, and the attitude of other members of the father's and mother's family, all contribute to the production of the situation.

The other situation contributing to the neurotic trends is the child's first great adventure in life, that of going to school. Here he comes face to face with a whole new series of situations to which he must adjust; work at fixed periods, rules and regulations, and the competition of a large group of his fellows. A considerable amount of work done upon this topic is undergoing analysis for later publication.

The question of *psychopathic personality* in children is one concerning which I hesitate to speak. The general idea of the psychopathic personalities is that they are constitutional or inborn trends in mental makeup. This is clearly brought out in the older name "constitutional psychopathic inferiority." Concerning this idea we have grave doubts. The more closely we have studied our cases which seemed to belong to this group, and the further we have pushed into the background of the origin of the behavior traits and trends which led to the diagnosis, the fewer times we make this diagnosis and the less we consider it a matter of a fixed reaction type. We certainly view very differently the problems of the adult of fixed psychopathic reaction type and the child whose reactions are of the same general type, but are not yet fixed. For the present, our view is somewhat as follows: there is no clear way of distinguishing between reactions which are fixed parts of the biological makeup of the organism and reactions which are acquired in the stresses and strains of life adjustment. While this is unsatisfactory as a formula, it is the best we can do in view of our experience. In fact this is the experience of all workers in the field, as Glueck in particular has pointed out.

There is one condition of definite disease which is worthy of separate classification and study. This is epidemic encephalitis. Reports coming to us from all over the country, and our experience this past year, all indicate that this is an increasingly important problem. So far as the behavior of these cases is concerned, it resembles very closely the behavior of the psychopaths. In our cases there is no evidence of an intellectual dementia, though sometimes there is apparently some retardation in the further intellectual development. There do come a series of alterations in the power to concentrate, in emotional reactions, especially irritability, in impulsiveness, inhibitions and in ability for sustained effort. With this there may or may not be a Parkinsonian syndrome, though this is usually to some degree in evidence. The behavior becomes impulsive in the extreme; is characterized by outbursts of uncontrolled temper, with manifestations of brutality, lack of appreciation of the feelings of others, loss of inhibition of sex impulses and of the acquisitive instinct, and an almost auto-

matic and quite uncontrolled response to any emotion-provoking situation. What to do with these cases is very much of a question. The change in character with the resulting alterations in behavior is so definitely the result of organic lesions in the brain that we feel the correctional institutions are not the places for such children. At the same time they are quite unsafe social risks, particularly because of the sex activity. They are not proper subjects for the training schools for feebleminded children, since they are not feebleminded. There is good experimental evidence in favor of a re-education program, but there has been no opportunity to carry this out. For the more marked cases, we have felt that commitment to the institution for mental diseases offered the best treatment available at the present time.

GENERAL DISCUSSION

This review of the case work of the clinic has necessarily been quite sketchy and so inadequate. It will serve, perhaps, to give some idea of the types of cases encountered and something of our present views of the problems presented. It would be extremely profitable to discuss the findings and methods of treatment applied to the different types of behavior for which the patients were referred. That is felt, however, to be too long a task for this particular paper. There are, however, certain questions often asked by professional groups, which may profitably be taken up.

The chief one is, where do you get your cases? Cases are referred from many different sources. In the Twin Cities, our cases have come to us as follows: 31 per cent from social agencies; 19 per cent from the school system; 7 per cent from physicians and hospitals; 7 per cent from juvenile courts; 10 per cent from miscellaneous sources, and 25 per cent from the families direct. Cases came from a total of twenty-seven social agencies. Less than a dozen physicians referred all the cases coming from the medical group. These two points make a curious contrast, which is somewhat difficult to explain. That so large a group of cases come direct from the families indicates the large number of parents who realize the need for such service and grasp at the opportunity afforded by the clinic. It seems to us, indeed, that the topic is very generally in the air and there are many people and groups of people who are ready to advance advice and answers to the many questions raised. The problems have so many medical aspects that it seems necessary to point out that medical interest must rise to meet the opportunity presented, else the profession will some day be regretting an opportunity overlooked. That pediatricians are alert to this is shown in many ways; that they lack training from the standpoint of the mental factors involved they readily admit, and they are trying to make some provision to meet it. An experiment we are watching with much interest is the entrance into the clinic for experience of a man with an excellent training in pediatrics.

This paper may be summed up by stating that in it are given facts and opinions regarding the medical aspects of behavior problems, drawn directly from a year's experience with a behavior clinic serving the Twin Cities. I am indebted to several members of the staff for aid with the tabular matter, and to many unquoted sources which have aided in the evolution of the ideas presented.

THE PHOTO-ACTIVITY OF SUBSTANCES CURATIVE OF RICKETS

In addition to conspicuous changes in the composition of bones in rickets, disproportions occur in the concentration of calcium and phosphorus in the blood plasma. The chemical make-up of the latter is soon restored to a more normal character whenever effective antirachitic measures are instituted. Cod liver oil has this regulatory power in a striking degree. It is an extraordinary circumstance that a substance containing neither calcium nor phosphorus should have the power to cause the calcium or the phosphorus, as the case may be, to rise nearly to the level commonly regarded as normal. Furthermore, cod liver oil not only acts as a regulator of the calcium and phosphorus metabolism, but also permits the organism to operate with greatly increased economy. No less remarkable than the action of cod liver oil, is the clearly demonstrated potency for this purpose of certain types of radiation, such as are present in direct sunlight and which emanate also from the quartz mercury vapor lamp. Because of the similarity of action of cod liver oil and radiant energy, it was predicted that a connection must exist between them. This relation has now been demonstrated. It has been shown that the chemical substances curative of rickets produce a blackening of sensitive photographic plates screened by quartz. Substances non-curative of rickets do not fog the plates. These phenomena are undoubtedly due to ultraviolet radiation. Thus oxidation appears to furnish the basis for the identical curative action of many substances and of sunlight in rickets.—*(Journal A. M. A., Oct. 11, 1924, p. 1169.)*

DIFFERENTIAL DIAGNOSIS OF PULMONARY DISEASE*

M. GEORGE MILAN, M.D.
Warren, Minn.

Any discussion relative to the subject of the differential diagnosis of pulmonary disease must necessarily divide itself into two primary and essentially distinct divisions. Of these, the first will deal with pathological lung conditions having the primary and important focus in the pulmonary fields themselves. The second will concern itself with lung pathology dependent upon either specific diseased conditions or abnormal changes situated elsewhere in the human anatomical unit, with the pulmonary disturbance becoming a secondary element to the above mentioned focus or foci as the case may be.

In this paper, limited as to time in the presentation of same, one cannot hope to enumerate, classify and discuss the various diagnostic factors peculiar to individual pulmonary affections. Accordingly, I have only endeavored to bring to you a discussion of certain facts and factors which may be of aid to diagnosis in this particular field.

I do not feel that there exists any system of basic formulae or set rules and regulations of procedure which of themselves, if strictly adhered to, will always lead to the diagnosis of any particular or all pathological conditions which may affect the main organs of respiration. Diagnostic formulae or rules and regulations in the chest field will invariably have a twofold value, namely: the absolute and the relative. This latter will comprise that personal equation which exists between every patient and his pathological process as well as the physician's natural and acquired ability to find, consider and summarize all particulars peculiar to the disease and to the individual attacked. The absolute value will be dependent upon those signs and symptoms which are generally found in varying degrees in individual specific, diseased conditions, regardless of the personal equation heretofore mentioned.

Information obtained from the history, and laboratory aids will to a greater or lesser extent, according to circumstances, enhance either one or both of these outlined values.

There is no infallible norm or status which tallies in every minute particular either in what we term similar diseased conditions or normal individuals. However, pathology of a specific nature does not, generally speaking, vary intrinsically according to its causative factors, for inflammation, consolidation or infiltration, when present in the lungs, remain per se as such, though their etiological elements, whether dependent upon traumatic, micro-organic or other origin, may be vastly different. They do not at any time lose their own inherent specific nature. The infiltrative process will manifest itself through its resultant bronchophony and pectoriloquy, its poorly defined impairment of resonance, moderate breath sound changes and râles of varying types with perhaps variable degrees of breath sound depression. Again, consolidation with its harsh and weakened respiratory murmur, bronchophony and pectoriloquy, circumscribed impairment of the resonance note and the early crepitant râle will transmit itself to us for dissection as to its etiologic factor or pathological entity. Râles are always râles, but seldom, if ever, will they tell us absolutely, by their character alone, the type of micro-organism or the mechanical factor which may be the stimulus to their production.

The mode of onset and the clinical course of the disturbance which has taken place before the patient presents himself before us, if correctly outlined, will many times narrow to small limitations the field of possibilities by consideration of the presumptive chain of evidence connected with individual pulmonary diseases.

The history of the individual case in its entirety is most important. Included in the same must, of necessity, be the time element, a factor which in lung diagnosis is indispensable. Definite diagnoses made without consideration of the disease duration will show a high percentage of error, particularly in subacute and chronic conditions. Information obtained from the patient will, among other things, enlighten us as to family and individual susceptibility.

Relative to symptoms and physical signs which aid in diagnosis, I would stress the statement that I do not feel that there is any dogmatic set of symptoms or of physical signs, or any one set combination of the above, that will be peculiar to each lung disease at all times.

The symptoms produced in the individual case,

*Read before the annual meeting of the Minnesota State Medical Association, St. Cloud, Minn., October, 1924.

as well as the physical signs of disease as found, will depend in a great measure upon the activity of the lesion, its location, the extent of tissue involvement and the patient's individual resistance to the reaction produced. To the above, we must also add the effect of foci remote from the lung fields which in themselves may have constituted the primary lesion with the pulmonary areas being only secondarily involved. This secondary involvement of the lung fields may be of an entirely different pathological nature than the causative primary disease situated elsewhere. However, in certain specific conditions wherein abnormal changes are present in the lungs, the nature of the focus can many times be quite accurately gauged by consideration of the primary remote focus. Especially is this true in cardiac disease, malignancy and acute infectious diseases when their effects become systemic in manifestation. Thus, by a retrograde process, we are enabled to work from effect to cause and thence to true diagnosis.

Passive congestion at the bases of the lungs with reflex inhibition of the diaphragm caused by the acute abdomen is a familiar figure to all of us. Indefinite and minimal abnormal changes in the respiratory murmur in early metastatic malignancy with the primary focus in a remote area of the anatomical machine will, at times, present itself for diagnosis.

Persistent râles in the apex, due to pressure of an intrathoracic thyroid, will lead us astray unless we are mindful to go farther than the pulmonary field itself for etiologic factors.

We are all familiar with the classical physical findings of apical cavitation in the lung with its manifestation through certain individual or a combination of the various abnormal findings produced in this localized area. Personally, I can recall two cases wherein the evidence obtained by physical signs was of a direct nature tending to cavitation, but subsequent knowledge obtained left only the opinion that no cavitation existed and that in reality a tuberculosis of the larynx had produced the above mentioned changes in the area under consideration.

The variation in degree of existing physical signs is one of importance to be noted in pulmonary disease together with their length of duration. A correct understanding of the course pursued, either in retrogression or convalescence, will make a doubtful primary diagnosis a definite one at subsequent examination.

Effects produced from pathological changes in this field of endeavor will invariably manifest themselves from the symptomatic standpoint, amongst which as being of value, I would mention abnormal temperature or pulse, cough, expectoration, dyspnea, hemoptysis, sweats, gastric symptoms, pain and sputum with its character, content, material and amount.

Relative to pulmonary conditions characterized by infection, it is always well to attempt to learn whether the condition complained of is active or inactive, and, having established this point, we can then proceed to determine the stage—whether it falls into the acute, subacute or chronic category. Accordingly, as the diseases will vary relative to these above divisions, so will the signs and symptoms of specific diseases of the chest vary.

In many acute respiratory infections, it is most difficult, except in occasional cases, to absolutely rule out the presence of tuberculosis at the first examination. When the disturbance has progressed into the subacute or chronic stage, however, the task becomes much easier, for then, by a consideration of the pre-examination clinical course, as outlined by the history, we can often draw conclusions as to what to most probably expect. Especially is this so if there is productive cough, fever, loss in weight and appetite, dyspnea or disturbances in the circulatory system.

Laboratory aid is perhaps the most conclusive evidence relative to specific etiology in the class of infections wherein we have an open lesion, in which event, the causative micro-organism is in the sputum. It is in the closed lesion where the offending micro-organism is not to be located by the microscope that we will experience our greatest difficulty. Personally, I do not recall ever seeing a case of pulmonary tuberculosis with a copious, heavy, purulent sputum which did not, on repeated examination, show the presence of tubercle bacilli. The absence of the tubercle bacillus in sputum of this type must invariably mean non-tuberculous disease. Should the case during its progressive clinical course manifest unmistakable evidence of phthisis, I feel that we have had a primary non-tuberculous condition which has become complicated by the breaking down of old, inactive tubercle or perhaps by new primary tuberculous infection.

Leukocytosis as an indicator of infection will

not tell us of itself whether a single infection of a certain type is present or whether there is a secondary superimposed infection in addition to the primary offending organism. This can well be demonstrated in cases of tuberculosis with concomitant mixed infection or those of the pneumonic type.

Abscess formation will be usually secondary to a primary tissue inflammation wherein the latter is the result of infection or of traumatic origin, or a combination of both.

Bronchiectasis has as its primary causative factor some element capable of weakening the bronchial musculature, thereby giving opportunity for chronic inflammatory disturbance with superimposed infection.

Lung tumor, particularly in its early stages, is shown perhaps best by its compression effects, thereby reducing to a greater or lesser extent the respiratory murmur in a localized area with like secondary smaller changes in the adjacent tissue. Paravertebral pectoriloquy will sometimes direct our attention to the possibility of pulmonary parenchymatous pathology as well as hilus involvement.

Pulmonary disease complicated by the presence of fluid in the pleural cavity will often be obscure as to its real nature until the fluid character is determined and particularly so if the latter should be of the hemorrhagic type.

No one can deny the value of the roentgen ray in this field of medicine and especially when used for confirmatory evidence, even though our knowledge of the etiologic factors may not be enhanced. Generally speaking, I do not feel that the roentgen ray of itself is going to make definite routine pulmonary diagnoses. Its valuable element is its usefulness in determining localization of pathology.

In closing, I would call the clinicians' attention to the following diagnostic aids:

1. Physical signs in determining the presence of pathology and its location and extent.

2. History and symptoms for the understanding of the clinical course of the disease.

3. Laboratory sputum examination in the search for etiologic micro-organisms.

4. Roentgen ray, with the plate to determine the presence of pathology and its extent, particularly as confirmative evidence, and fluoroscopy for its usefulness in the detection of motion with reference to anatomical or pathological structures in the thoracic respiratory apparatus.

DISCUSSION

DR. GEORGE DOUGLAS HEAD (Minneapolis): Dr. Milan very kindly forwarded an abstract of his paper to me, so that while I regret that I am late I have definitely in mind the points that he has made. It is true in almost all diagnostic work in medicine that each case is a study by itself. I am inclined to think that in the past we have attempted to lay too great stress upon some special sign or feature of the case, which has been put forward by one advocate or another as characteristic or diagnostic for the special pathological condition encountered. This certainly is not true, and men of long experience recognize it. They recognize that there are very few well defined pathological findings or well defined clinical signs or symptoms which are of diagnostic value when taken out of the general setting of the whole disease picture.

I am very glad indeed that Dr. Milan approached this whole subject from such a broad standpoint. I personally am of the opinion that the pendulum has swung entirely too far in our attempts to recognize disease of the lungs by the special laboratory procedures which we have in late years been taught to rely upon so strongly. I agree with him absolutely that the *x*-ray studies of the chest, even done by the most expert men, are of only relative value, and are not specifically diagnostic. They are evidence, and sometimes very strong evidence, of pathological change in the lung, but they are rarely diagnostic. Outside of the typical *x*-ray pictures of acute miliary tuberculosis, I know of no pathological condition of the lung that cannot be simulated by one of two or three diseases when *x*-ray studies are made of the patient. I have been painfully aware in my own experience of the very marked limitations of the *x*-ray in attempting to discover early tuberculosis; not that the shadows are not there, but the question arises when a man sees the shadows what is their significance? Is it evidence of a healed, or latent, or active disease, and upon that very point hinges the whole question of the diagnosis.

I think that a history well taken by a man of experience is of very great value. When the patient answers "no" to the question of exposure to tuberculosis in early life, I always follow up that first question with a second one directed to the possibility of exposure which the patient may have forgotten.

For example: Only a few days ago in catechising a patient where I suspected a concealed form of the disease, the patient answered "no" to the question of exposure to a tuberculous infection. "Now," I said, "think back over your early life even when you were a child. Can you remember anyone in your family who had consumption?" To this question she answered "no." Then I said: "Can you remember anyone that visited your home when you were a child who had consumption?" She thought for a minute and then said: "Why, yes. When I was a little girl about six years of age my mother had a personal friend who lived

with us for more than a year. She had consumption and died at our house."

Now that fact was the key to the diagnostic problem. Without that history I doubt very much whether I would have been able to have established beyond a doubt the diagnosis of early tuberculosis; but with that history, plus doubtful signs in the chest, plus *x*-ray shadows, plus positive tuberculin tests, an exhaustion type of the disease was finally worked out.

So with cases of bronchiectasis, if one goes into the history in detail, one can almost surely get a history of cough with a large amount of sputum at certain times of day. This is very suggestive and quite a different history from the cases of early tuberculosis or other lung conditions.

I consider sputum examination of very great importance, not only from the positive but from the negative side. The presence of tubercle bacilli in the sputum is diagnostic for pulmonary tuberculosis. The absence of bacilli, when repeated examinations are made, is often of great significance. The presence of eosinophiles in the sputum is of great significance in establishing the diagnosis in certain cases of asthma, pollen bronchitis and the like.

Every now and then one comes upon individuals with recurring cough, induced by a bronchitis, that is not bacterial but dependent upon certain pollens in the air. Just such a patient I have just had the privilege of studying, a woman of middle age, living in Iowa, who has been suffering from a cough very difficult to interpret. In this case, the presence of eosinophiles in the sputum and of an increased eosinophilia in the blood (a percentage of six and eight), with negative tuberculin tests assisted greatly in the proper interpretation of the condition.

As I have said, every case of lung disease is a study by itself. A careful history, a thorough physical examination, and well worked out laboratory and *x*-ray findings all are of importance, the two first mentioned particularly so.

We talk about the importance of surgical diagnosis and the recognition of acute surgical conditions. There is no diagnostic problem that presents itself to the physician which is more important than the recognition of pulmonary tuberculosis early in the course of the infection. I do not know of any surgical disease, except perhaps some of the very acute conditions where life hangs in the balance, in which the decision is of greater importance to the preservation of the life of the individual and the conservation of his usefulness to society. And, yet, I presume if there is any charge to be made against us as diagnosticians it is the fact that year after year we go on overlooking serious lung disease in individuals who come to us when early symptoms first manifest themselves and put them off with a diagnosis of bronchitis, or an infectious cold, or nervous exhaustion, neurasthenia and the like.

Dr. L. A. Nippert (Minneapolis): Dr. Milan's succinct paper opens up a wider field for discussion.

In the diagnosis of all pulmonary infections, the taking of a complete history is of greatest importance. For instance, the *several* occupations of the patient must receive attention—a farmer with chronic cough may have been a miner for years, as it happened in one of my cases. The history will also frequently disclose the source of infection as in pulmonary tuberculosis, parrot-pneumonia, dystoma pulmonalis.

After the history a complete physical examination is the next step. In the early diagnosis of pulmonary tuberculosis the persistence of a fine râle or squeak in the apex of one lung with a history of failing health is sufficient to establish a working diagnosis. This combination of symptoms and this one sign has frequently enabled me to make a diagnosis before bacilli were found in the sputum.

To the microscope we owe the discovery of the bacillus tuberculosis, the fungus of actinomycosis, the spirillum of Vincent and pulmonary parasites. The presence of pigmented cells may assist us in differentiating heart lesions or tumors from pulmonary tuberculosis. The finding of bronchial casts or of Curschman spirals may aid us to distinguish between fibrinous bronchitis and asthma.

Finally the use of the fluoroscope may prove to be of greatest value. In the farmer-miner case mentioned before, his former occupation of a miner was suspected at once, by the dark spots seen scattered throughout both lungs. Tumors and foreign bodies as causes of lung disease may be disclosed on the screen or on the plate where physical signs fail, as in a patient with a parotid tumor of three months' duration who complained of intense pain in the region of the fifth dorsal vertebra. Suspecting a metastasis, a plate was taken. The result was a surprise as both lungs showed secondary tumors scattered throughout. They had given no subjective symptoms whatever and several physical examinations before and after their discovery were negative. By the use of the fluoroscope we may also eliminate mediastinal and heart affections.

Dr. H. Longstreet Taylor (St. Paul): I still hold that the most important thing in making a diagnosis of any lung condition, is to sit down and talk with the patient. Get that man's history. Get his story of the case. Do not lead him on, but let him tell you, and by the time you are ready to examine him you will find that you already have more than half of your diagnosis.

The *x*-ray is an exceedingly valuable thing, and those who have practiced for years before we had its assistance know better how to appreciate it than some of the newer ones who have not had that experience. Without the *x*-ray cancer of the lung was considered to be a very rare condition. Now we know how frequently it is present, and since we have had *x*-ray pictures of the lungs, it is not mistaken for other conditions as it used to be. An abscess of the lung does not present the same serious problems that it did, now that it can be located positively. In many cases of bronchiectasis, of course, the first whiff of conversation you have with the patient enables you to make a diagnosis of the case.

Dr. M. George Milan (closing): Mr. Chairman: I am not entirely convinced that persistent râles in an apex always means pulmonary tuberculosis. Pressure from an intrathoracic thyroid as well as a chronic catarrhal apex will often produce evidence of this physical sign, with no pulmonary tuberculosis being present.

Relative to physical signs, it seems to me that we cannot at any time get away from the great value of physical signs. In making these diagnoses, individualization is

necessary at all times and if we individualize every case, we will find that our percentages of correct diagnosis will be on the increase.

Again, as an aid in diagnosis, let us never forget that the lungs are only a part of the general anatomical unit, and during our examination we must take into consideration the system as a whole as well as the localized area where we are having the disturbance as manifested by the physical signs.

In regard to early pulmonary malignancy, during the last few months, I have had the pleasure of seeing four or five cases wherein this condition was present and I want to say that we do get definite physical signs in the pulmonary field in this condition. The early evidence may be present from the standpoint of a change in the respiratory murmur as manifested at times by compression effects either in small or large areas, and again at times by paravertebral pectoriloquy. With such findings present and the knowledge that the patient has a malignant focus elsewhere in the body, a diagnosis of malignancy in the chest should be justified even before the *x*-ray plate has confirmed such an opinion.

At our clinic, it is the custom, when there is any possible chance, to have the lung man examine the pulmonary fields of surgical cases pre-operatively. We frequently have cases coming for operation, who, following the pulmonary examination, are sent back home with the operation postponed indefinitely on account of the pulmonary condition. I am speaking particularly of the type of surgical cases which can wait a little while and not the acute type, which demands immediate operation with no alternative.

HEXAMETHYLENAMIN

Like the earlier attempts to "disinfect" the alimentary tract through ingestion of selective germicidal substances, the efforts to render the entire organism free from microorganisms by a similar therapeutic procedure have not been attended with conspicuous success. Hexamethylenamin was early hailed as promising success in these endeavors. It has been recommended as an antiseptic agent for virtually all the body fluids. It was soon demonstrated, however, that bacterial growth is not prevented by it, even in proportions much higher than could be found anywhere in the body. This important evidence rendered it improbable that the administration of hexamethylenamin can exert marked antiseptic effects in the tissues. In an acid solution hexamethylenamin disintegrates into ammonia and formaldehyd, and to the latter substance are doubtless due the beneficial therapeutic results experienced in the treatment of urinary infection. A recent study demonstrates that the alleged beneficial effects of hexamethylenamin systematically in various infectious diseases cannot be explained by the presence of adequate liberation of formaldehyd in the circulation and tissues. The drug itself is not antiseptic; and the hope of securing systemic antisepsis through its use seems forlorn. Its one field of action seems to be in pathologic conditions in the urinary tract, and it is necessary that the urine be markedly acid. *(Journal A. M. A., Nov. 22, 1924, p. 1688.)*

FRACTURES OF THE SPINE*

EMIL S. GEIST, M.D.
Associate Professor, Orthopedic Surgery, University of Minnesota
Minneapolis

This is so large a subject that it is manifestly impossible to embrace it within the confines of a "paper." Neither is this necessary. We have at hand a number of text books which deal with this lesion in a more or less comprehensive manner; none, however, with any desirable degree of completeness or finality. Among the best are those of Cotton[1] and Frazier[2]. It is with the idea of adding my mite to the sum total of the literature which is accumulating especially rapidly during the past few years that I report clinical data and observations of seventy-four cases of fractured spines.

These cases can be classified in various manners, for instance, either as to: (1) anatomic location of the fracture; (2) recent or old; (3) with or without paralysis.

Isolated fractures of the transverse processes, laminæ and spinous processes are not considered in this paper. They are rather rare and their prognosis is invariably good. Neither are there added to this list the pure dislocations nor the pathologic fractures of the spine.

Age and Sex.—The youngest case of this series was seven years old (a case of atlanto-axoid fracture dislocation); the oldest was sixty-seven years of age; nearly all cases occurred during the active period of life (twenty to thirty-five years old). Sixty-four cases occurred in males; eight in females.

Occupation.—In this series, all sorts of occupations were represented. Nearly all large published series of fractures of the spine have been reported from mining communities in which the nature of the injury is of the crushing type (by falling masses of earth, etc.). In this particular series, occupation played no particular part in the etiology of the condition, and injuries of the crushing type were comparatively infrequent.

Manner of Injury.—As above mentioned, there are no "mining injuries" represented in this series. Falls from heights, as from ladders, hay-stacks, bridges, etc., occurred in twenty of the cases. In seventeen cases, the injuries were due to automobile

*Presented before the annual meeting of the Minnesota State Medical Association, St. Cloud, Minn., Oct. 10, 1924.

accidents. In eight cases, the injury was of the crushing type, while the balance (twenty-nine cases) were due to diving injuries, direct violence, train wrecks, elevator injuries, etc.

Classification of Seventy-four Cases in this Series.—There were twenty-two cases seen within the first twenty-four to forty-eight hours following injury (fresh cases). Fourteen cases were seen from one week to three months following the injury. These can be classed as intermediate; thirty-eight cases can be classed as old cases, having been seen three months or more following the injury. Of these latter, the larger number were seen between one and five years following the injury.

In the fresh cases (twenty-two), paralysis occurred in fourteen. In eight, there existed no paralysis. In the old cases, there existed paralysis in two, no paralysis in thirty-six; and the chief symptom in these old cases was pain and stiffness and more or less disability. In five of the fourteen cases classed as intermediate there existed paralysis, while there was no paralysis in nine.

Diagnosis.—The diagnosis of fracture of the spine can be very easy, or it can be very difficult. When there exists paralysis, a fracture of the spine and its level is usually easily determined. Since the advent of the *x*-ray, fractures of the spine ought never to be missed. It is surprising that even at this advanced date such a large percentage of fractures of the spine (those without paralysis) escape recognition. Most mistaken diagnoses (according to Cleary[4]) are due to the following:

"1. An erroneous conception that every broken neck or broken back presents symptoms and physical signs so unmistakable as to practically diagnose itself.

"2. Inadequate *x*-ray examination.

"3. Concentration of attention upon some more apparent complicating lesion.

"4. Failure to get a clear history of the nature and violence of the force, or forces, which the accident brought to bear upon the patient's spine.

"5. Failure to make a thorough physical examination.

"Many non-medical members of the public believe that a broken neck, or a broken back, means either instant death or, at least, paralysis. Careless physical examination lends support to this popular fallacy."

In this series, about 25 per cent of the cases of fracture of the spine without paralysis were not previously recognized; the chief reason for this was that *x*-ray had not been employed. It is necessary to get, in the first place, the history of the manner of the injury. The trauma need not be of extreme severity. Two of the cases in this series were caused from falls on icy sidewalks. In the great majority of the cases, the accident was of some magnitude. Guarded motions of the body, rigidity of the damaged segment of the spine, limitation of motion, tenderness over the area involved, disability (especially as to weight-bearing, lifting and stooping) are all significant symptoms. It is true that an occasional case of fracture (especially in the cervical region) gives no symptoms whatever at a late date. A number of cases of marked fracture dislocation of the cervical spine walked into the office with no further symptoms than a slight amount of stiffness of the neck. The fractures in the neighborhood of the dorso-lumbar region, however, which are so much more common, are usually accompanied by more or less disability. Disability, due to fractures of the dorso-lumbar region, ranged (in this series) from 40 to 100 per cent. The *x*-ray delivers the final judgment as to the presence, or absence, of a fracture, but the *x*-ray must be a good one. Indifferent *x*-rays of the spine lead to error and missed diagnosis. Lateral views are imperative, as well as stereoscopic roentgenograms.

Vertebræ Involved

Cervical,			
	I.....	1 case	
	II.....	2 cases	
	III.....	3 "	
	IV.....	4 "	27
	V.....	7 "	
	VI.....	7 "	
	VII.....	3 "	
Dorsal,			
	I.....	0 cases	
	II.....	0 "	
	III.....	0 "	
	IV.....	3 "	
	V.....	2 "	
	VI.....	1 "	
	VII.....	1 "	33
	VIII.....	4 "	
	IX.....	1 "	
	X.....	2 "	
	XI.....	10 "	
	XII.....	9 "	

Lumbar,

I.....	15 cases	30
II.....	7 "	
III.....	3 "	
IV.....	1 "	
V.....	4 "	

It will be seen that the region most often involved extended from the eleventh dorsal to the second lumbar vertebra. Frequently the bodies of two vertebræ were broken.

Complications. — Complications occurred in eleven of the cases and, in this series, consisted of fractures. These fractures were usually of the extremities and did not interfere materially with the treatment of the spinal fracture. In sixty-three cases, there existed no complicating injury.

Paralysis.—Twenty-five cases presented paralytic symptoms. Forty-nine did not show any signs of paralysis at any time. In most of the cases, paralysis was total below the segment of the spine involved. In a few, there existed partial paralysis of an extremity. We have again eloquently borne out the statement frequently made that most cases of fracture of the spine are not accompanied by paralysis. In this series, there was no nerve involvement in two-thirds of the cases, while one-third were of the paralytic type.

Deformity.—There existed deformity in thirty-three of the cases. In forty cases, there existed no deformity whatever. Those cases with deformity can be sub-divided as follows:

1. Deformity of the neck (wry neck, etc.) . . 5 cases
2. Kyphosis .....25 "
3. Lateral Deviations of the spine..... 3 "

Complaints of Patients.—The chief complaints of patients are listed below. In those patients paralyzed, the chief complaint, of course, was the paralysis of the members involved and the loss of bowel and bladder control. The complaints of the patients in those cases not paralyzed were as follows:

1. Weak back .....37 cases
   No weak back.....12 "
2. Stiff back (rigidity).....46 "
3. Inability to lift heavy objects.....40 "
4. Pain .....36 "

Fresh Cases.—There were twenty-two cases seen within the first twenty-four to forty-eight hours. Of these, ten occurred in the cervical, seven in dorsal and five in the lumbar region. Of the ten cervical cases, seven were operated upon, one by manipulation and six by laminectomy. The case which was manipulated improved forthwith; paralysis disappeared and the patient is well today. Of the six laminectomies, four died—two of them on the operating table. Two of the cervical cases submitted to laminectomy improved so that they again walked about. In the seven dorsal cases, there were four operations, all laminectomies. In two of the cases no improvement was noted, and in two cases improvement was seen. Of the five cases of lumbar fracture, there were two operations (laminectomies). In neither of these cases was improvement noted. Of the twelve laminectomies done, two died on the table, two died shortly afterwards, four showed improvement, and four showed no improvement.

To summarize, four seemed to derive benefit from the operation and eight did not.

Fresh cases of fracture of the spine with paralysis present one of the most serious and trying problems with which the surgeon has to deal. Set rules can never be laid down. Each patient is a case unto himself.

Cotton[1] says: "As to treatment of fractures or of fracture-luxations with cord damage, there is little to be said that is not open to dispute. In this region, pressure on the cord that suffices to give paraplegia means usually a transverse total lesion of the cord which is beyond the present resources of surgery. Such a lesion means permanent paralysis with death resulting at an interval varying from twelve hours to many months. Here and there, laminectomy or forcible correction without incision has seemed to be the determining cause of recovery, total or partial. In competent hands, either operation is next to harmless and is always justifiable, if not hopeful."

He also says: "Laminectomy in expert hands is not risky, but it is difficult and distinctly a surgeon's operation not to be undertaken by the inexperienced operator, especially if his assistance be not of the best."

Frazier[2] says: "In considering the indications for operations in injuries of the spine and cord, one must not overlook the benefit that may be derived weeks or months after original injury."

On the following page is reproduced Table XIII, Page 448, in Frazier's book.

This table represents twenty-eight cases operated by various surgeons. Frazier's conclusions from this table are: "From this, it will be seen

that one in four was entirely well, one in four partially incapacitated, one in two and one-half completely incapacitated, and one in nine died subsequent to discharge from the hospital." It is apparent that Frazier is in favor of laminectomy in cases of spinal fracture accompanied with paralysis.

Mixter[3] reports sixteen laminectomies, of which four were improved, six were unimproved and six died. It may be said, therefore, that the modern consensus of opinion in these cases of fracture of the spine, with paralysis, seems to be that laminectomy, as a general rule, should be tried after the case has been most carefully studied and if the patient's general condition warrants it. Hyperpyrexia and extremely difficult breathing are the chief contraindications.

In my series, as well as in those of Frazier and Mixter, the percentage of cures following laminectomy is small. Laminectomy still remains a somber chapter in surgery. Nevertheless, without this operation, the outlook is still more gloomy.

The treatment of cases without paralysis can be divided into (a) treatment of fresh cases; (b) treatment of old cases presenting symptoms. The profession is pretty well agreed that the fresh cases without paralysis need, above all, rest and recumbency, such as is offered by the Bradford frame. If deformity exists, the attempt should be made to reduce it by gradual means in a manner similar to that used in Pott's Disease. This is usually possible either by increasing the curve of the Bradford frame on which the patient lies, or by substituting a series of felt pads as advocated by Cotton. Ten or twelve weeks of recumbency should be followed by the application of a well-fitting cast and later a brace. Adequate fixation, plus reduction of the deformity, certainly will minimize the degree of

Years between time of accident and report.....	1½	1½-2	2-3	3-4	4-5	5-10	Over 10	Total
Entirely well	..	2	1	..	..	3	1	7
Partially incapacitated	1	2	1	1	2	..	..	7
Confined to house.....	1	2	2	2	..	..	..	7
Confined to bed.....	1	..	..	1	2	..	..	4
Died	1	1	..	..	1	..	..	3

Table XIII, Frazier's book.

Old Cases.—There were thirty-eight old cases in my series. Of these, eight involved the cervical spine, fourteen the dorsal spine and sixteen the lumbar spine. The dorso-lumbar region was most frequently involved. It is in this type of case that the condition is often not diagnosed. Twenty-five per cent of this series of old cases were not diagnosed before we saw them, but were called "back strains," "wrenched backs," etc. Nearly all of the cases came on account of disability due to pain, rigidity and inability to lift. In most of the cases, the application of braces for fixation and support afforded relief.

The average disability ranged from 50 to 75 per cent. In a few, there was no disability (cervical spines), while in eight or nine of the dorso-lumbar cases, 100 per cent disability existed, although there was no paralysis. In the severer cases, the application of braces can only be classed as palliative treatment. In ten of the cases complaining of painful symptoms and rigidity, the ankylosing operations of Hibbs and Albee were recommended following the published papers by Brackett, Mixter and Wilson.[5] In this series, but one spine was fused by open operation, with complete success.

future disability and probably will render unnecessary later fixation operations.

It is the untreated and unrecognized case that presents the chief symptoms later. Here, there was no intelligent attempt made at immobilization. Callus formation is more abundant than it should be. The deformity is, as a rule, greater than it would have been under proper fixation treatment and the result is a stiff, weak and painful back. Therefore, early recognition of these back lesions is vitally important.

After the case becomes an "old" one, the treatment to be considered lies between the application of a brace or of a fixation operation. On a man presenting a good operative risk, I believe the operative procedure is to be preferred, as the end results so far published seem to warrant an assumption that we have here a method of actual relief of all, or most, symptoms. If operation is refused, or for

any reason impracticable, we must rely on the fixation brace to relieve the affected portion of the spine of as much weight-bearing as possible, as well as of affording rest.

In this connection, it may be well to allude to that form of spinal lesion known as "Kuemmell's Disease." This is a lesion following a trauma of greater or less severity. Consensus of opinion now seems to be that we are dealing here with a crushing fracture of a portion of a body of one vertebra, unrecognized; presenting later a characteristic deformity (abnormal narrowing of the discs as well as of the affected vertebral body), accompanied by symptoms of pain, rigidity and disability, together with a sharp, angular knuckle. History of injury is usually ascertainable on careful questioning.

CONCLUSIONS

1. In fresh fractures with paralysis, laminectomy and forcible reduction throw a slight ray of hope into an otherwise dark future.

2. Fresh cases, without paralysis, need prolonged fixation treatment, which includes the gradual correction of a deformity, if present.

3. All injuries of the spine, no matter how trivial the trauma, demand careful study and liberal use of the *x*-ray. Failure of diagnosis is today frequent and leads to unnecessary suffering and useless legal complications.

4. Occasional "old" cases, especially in the cervical spine, complain of no symptoms.

5. "Old" cases, as a rule, cause definite symptoms of pain, rigidity and a high percentage of disability. When they do, the fusion operations seem to promise relief of symptoms and reduction of disability.

REFERENCES

1. Cotton: Dislocations and joint fractures. 2nd Ed., 1924.
2. Frazier: Surgery of the spine and spinal cord. 1918.
3. Mixter: Fractures of the spine with cord involvement. Jour. Bone and Joint Surgery, 1923, 21, 21.
4. Cleary: Fractures of the spinal column. Cal. and West. Med., May, 1924.
5. Brackett, Mixter, Wilson: Operative treatment of fractures of the spine complicated by cord injury. Ann. Surg., May, 1918.
6. Sever: Traumatic back injuries and their treatment. New York State Jour. Med., 1922.
7. Le Breton: A case of fracture of the odontoid process of the axis. Am. Jour. Orthoped. Surg., Sept., 1916.
8. Elliott and Sachs: Observation on fracture of the odontoid process of the axis with intermittent pressure paralysis. Ann. Surg., Dec., 1912.
9. Peckham and Hammond: Some interesting and unusual cases from the orthopedic clinics of the Rhode Island and St. Joseph's Hospitals. Boston Med. and Surg. Journal, April, 1909.
10. Cotton: Fractures of spine and pelvis. Reprint (no date).
11. Wallace: Crush fractures of the spine. Jour. Bone and Joint Surgery, Jan., 1923.
12. Kleinberg: Fracture of the spine. Jour. Bone and Joint Surgery, vol. 20, 1922.
13. Thomson: Fractures of the vertebræ and their treatment. Orthopedic Section, Transactions A. M. A., 1921.
14. Sayre: Observations on broken necks. Am. Jour. Bone and Joint Surgery, 1906.
15. Jones: Compression fracture of the spine developing delayed symptoms. (Post-traumatic spondylitis and Kuemmell's disease. Transactions of Section of Orth. Surg., A. M. A., 1923.

DISCUSSION

DR. M. S. HENDERSON, Rochester: Dr. Geist's paper is well worth our serious consideration. These fractures of the spine, of course, are attended with a high mortality. Generally speaking, the higher the fracture is, the more apt the patient is to succumb. Laminectomy is justifiable certainly in most cases, and, although attended with a high mortality, we must remember that there is also a very high mortality without the operation. Of special interest, I think, is the series of cases Dr. Geist showed us without any paraplegia. If, instead of a compression fracture, you have a fracture of the articulating processes and the vertebra slips forward and dislocates, you may get a severe laceration of the cord with a consequent paralysis. In those cases there is no recovery, but in the compression fractures which so often escape observation and are discovered late, paralysis may not develop at all, or may be only transitory.

The subject has an important bearing, from a medicolegal viewpoint. It is well to secure an *x*-ray of the spine where there has been any severe trauma sustained. Occasionally, particularly where there is a question of compensation concerned, the consultant is confronted with a strong, husky man, who appears to be in perfect health, but complains that he cannot work on account of his painful spine. His spine, on examination, seems movable, and one is apt to conclude that although he is not a malingerer he at least is exaggerating his trouble and as soon as the compensation is settled he will get well. He wanders away and consults someone else, who takes an *x*-ray and kindly informs you that they have found a compression fracture of one of the lumbar vertebræ. Dr. Geist's bringing up of this subject is very timely, for with the present day method of rapid transit via automobile these fractured spines are sustained not only in railway accidents, but also in the automobile accidents.

DR. A. T. MANN, Minneapolis: This has been a very interesting paper to me. I think there is one thing which may help to classify some of these things a little, and that is that the fractures in the cervical region, in the dorsal region, and in the lumbar region are different. We have three different situations. In the lumbar region the cord stops at the bottom of the first, sometimes at the top of

the second, lumbar vertebra, so that the fractures at the second or below are fractures which involve the cauda equina; that is, fractures which involve the nerves and not the spinal cord proper. Those are very much more hopeful than fractures which involve the spinal cord. We know that we get a great deal of regeneration in the nerve; we get practically none in the cord. So we expect more hopeful results from operation, and operation is indicated in more cases in the lumbar region.

When it comes to the cervical region, fractures above the fourth cervical, which involve the cord, cut off the phrenic nerve and paralyze respiration even of the diaphragm. These cases die and die rapidly. You can expect them to die. In the cervical region one is a little more hesitant about deciding in favor of operation than in some other locations. Some of those cases in which operation is done and there is a new injury to the cord at the operation itself, are more apt to die, too. However, if the laminæ are broken, as shown in the *x*-ray plate, and fragments are pressing on the cord, operation is indicated. This is a very broad subject. The cases which I have not spoken of require a great deal of careful study before a decision for or against an operation can be made.

Dr. B. S. Adams, Hibbing: I had a case rather recently which illustrates how easy it is to make mistakes in these cases. This man was in a mining accident. He had a fracture of the ischium, dislocation of the shoulder, and numerous cuts and bruises on various parts of his body. He did not complain very much of his back. We *x*-rayed him, taking of the back only an anterior and posterior view. He was in the hospital for several months, recovered, went home, laid around the house for a month or two, went back to work. He had an easy job watching a pump. Along about that time he began to complain of his back, and we thought naturally that he was making a fuss to get more compensation. It continued, however, and later we brought him back and took a lateral view of his spine which showed a compression fracture of the first lumbar vertebra, which the anterior-posterior view had not shown. If we had not taken it we would probably still have thought he was simply after more compensation, and yet the fellow was injured. But the peculiar part was that the pain in his back did not develop until rather late.

Dr. A. R. Colvin, St. Paul: It so happens that in the course of the last six or eight months, I have seen six cases of compression fractures of the vertebræ which were admitted to the hospital, complaining only of pain in the back. The radiograph in each case showed quite positively compression fracture. Without radiographic study, some of these conditions would have been very difficult of diagnosis.

At a time when I was seeing a considerable number of fractured spines with paralysis at the Ancker Hospital, an extensive review of the subject appeared in the Ergebnisse der Chirurgie und Orthopadie, giving the literature of many countries. Summarizing, the author said that surgeons were divided into three classes—"those who would operate on every case, those who carefully selected a case and those who never operated at all. The first group would have a trail of disaster and, perhaps, in a lifetime, have one brilliant result. The last group might, perhaps, miss one opportunity. I confess to belonging to the last group, but I have seen several recoveries which, of course, did not require an operation.

I think that there is one rule that may be safely followed in complete paralysis of both sensation and motion, at a given level occurring immediately at the time of injury: it can be concluded that the cord is destroyed and operation futile.

While at Fort McHenry, a soldier was brought in one night with motion paralysis of the lower extremities, but not complete loss of sensation. All of the consultants, orthopedic, neurologic and general surgeons urged that he be operated upon. It was up to me to make the final decision, and I begged off for a few days and then drifted along a few more. Finally, a month went by and I became quite uneasy, because, in the army hospitals, one felt several kinds of responsibilities. I had seen the patient almost daily and was encouraged to find that about this time he began to move his extremities and finally could lift them from the bed. At this time, a celebrated neurological surgeon came as consultant and I was very eager to have his opinion. He said that if he had seen him immediately after the injury, he would have operated, but because he was recovering now he would not. He then said further that he saw a great many spinal injuries in consultation with the mining surgeons in his state, and he noticed that up to the age of fifty, they were keen to operate on spinal injuries, but after that age they were not.

Most of the cases that I have seen at the Ancker Hospital, and later died, proved at autopsy to have destruction of the cord.

Dr. Emil S. Geist (closing): I want to thank the gentlemen for the discussion, which was very instructive to me. I am not quite as pessimistic as Dr. Colvin. Certainly, not every fractured spine needs operation, but, as Cotton says, laminectomy in itself is not a very difficult nor very dangerous operation. When we see a poor mortal with a spine fracture lying before us looking for help, we can only say to ourselves, "Is there a chance?" And, granted that the patient is not in extremis, is not breathing hard, has not a high temperature and granted that we have not the history of the immediate, rapid, transverse lesion, I, for my part, believe that the operation gives him an increased chance. Then, we have some published lists to support this view. No one can say that the cases that get well would have gotten well without the operation. I believe there is too much pessimism in the dictum "never operate."

I wanted to call attention to the unrecognized case without paralysis. It is only a few months ago that a discharged soldier came to me; he came for relief for a sore back. He had been thrown by a shell, not injured by the shell itself, but thrown into the air some twenty-five feet by an explosion, and lit on his back. He had been passed from hospital to hospital. He told me he had been at twelve or fourteen various places, and apparently no one had taken an *x*-ray, because the *x*-ray showed a clean-cut fracture of a vertebra in the dorsal region; it was an easy case to diagnose. It simply shows how, without the *x*-ray, eminent surgeons can be thrown off their guard and can miss these cases. As Dr. Adams again pointed out, it is not only the anteroposterior view, but also the lateral view which is most essential in these cases.

W. L. BURNAP, M.D.
Fergus Falls
President of the Minnesota State Medical Association, 1925

MINNESOTA MEDICINE

OFFICIAL JOURNAL MINNESOTA STATE MEDICAL ASSOCIATION, SOUTHERN MINNESOTA MEDICAL ASSOCIATION, NORTHERN MINNESOTA MEDICAL ASSOCIATION, AND MINNEAPOLIS SURGICAL SOCIETY

Owned and Published by
The Minnesota State Medical Association
Under the Direction of Its
EDITING AND PUBLISHING COMMITTEE

R. E. FARR, M.D. Minneapolis
JOHN M. ARMSTRONG, M.D. St. Paul
L. B. WILSON, M.D. Rochester
F. L. ADAIR, M.D. Minneapolis
J. T. CHRISTISON, M.D., St. Paul

ADMINISTRATIVE OFFICERS
MINNESOTA STATE MEDICAL ASSOCIATION

W. L. BURNAP, M.D., *President* - - - - Fergus Falls
A. S. HAMILTON, M.D., *First Vice President* - Minneapolis
JOHN LIBERT, M.D., *Second Vice President* - - St. Cloud
C. W. MORE, M.D., *Third Vice President* - - - Eveleth
E. A. MEYERDING, M.D., *Secretary* - - - - St. Paul
EARLE R. HARE, M.D., *Treasurer* - - - Minneapolis

MEMBERS OF THE COUNCIL

G. S. WATTAM, M.D., *First District* - - - - Warren
J. G. MILLSPAUGH, M.D., *Second District* - - Little Falls
H. LONGSTREET TAYLOR, M.D., *Third District* - - St. Paul
W. H. CONDIT, M.D., *Fourth District* - - - Minneapolis
H. M. WORKMAN, M.D., *Fifth District* - - - Tracy
F. R. WEISER, M.D., *Sixth District* - - - - Windom
F. A. DODGE, M.D., *Seventh District* - - - Le Sueur
W. F. BRAASCH, M.D., *Eighth District* - - - Rochester

EDITORIAL OFFICE
CARL B. DRAKE, M.D., Editor
402 Guardian Life Bldg., Saint Paul

BUSINESS OFFICE
J. R. BRUCE, Business Manager
402 Guardian Life Bldg., Saint Paul
Telephone: Cedar 1683
201 Commercial Bldg., Minneapolis
Telephone: Atlantic 2716

All correspondence regarding editorial matters, articles, advertisements, subscription rates, etc., should be addressed to the Journal itself, not to individuals.

All advertisements are received subject to the approval of the Council on Pharmacy and Chemistry of the American Medical Association.

The rate for classified advertising is five cents per word with a minimum charge of $1.00 for each insertion. Remittance should accompany order. Display advertising rates will be furnished on request.

Subscription Price: $3.00 per annum in advance. Single Copies 25c. Foreign Countries $3.50 per annum.

VOL. VIII JANUARY, 1925 No. 1

EDITORIAL

Origin, Purpose, and Organization of Child Guidance Clinics

In 1921, the Commonwealth Fund of New York adopted a "Program for the Prevention of Delinquency." The policy of this program was as follows:

1. "To develop the psychiatric study of difficult, predelinquent, and delinquent children in the schools and the juvenile courts; to develop sound methods of treatment based on such study and to provide courses of training along sound lines for those qualified and desiring to work in this field.
2. "To demonstrate in a number of widely scattered cities the value of such psychiatric study and treatment applied to children of this sort referred from juvenile courts, schools, and other agencies.
3. "To develop the work of the visiting teacher whereby the invaluable early contacts (which our school systems make possible) with every child may be utilized for the understanding and development of the child.
4. "To extend by various educational efforts the knowledge and use of these methods."*

This program provided for the combined efforts of four distinct organizations, of which the Division on the Prevention of Delinquency of the National Committee for Mental Hygiene was one. This organization's plan of operation as part of the program has been related to purpose No. 2—to establish demonstration clinics in Child Guidance. These clinics are placed for a period of a year in a community which is adequately equipped medically and socially to carry out the project following the year of demonstration and with an assured purpose to do so. The Child Guidance Clinic operated at the University of Minnesota from November, 1923, to November, 1924, under the direction of Dr. Lawson G. Lowrey, was part of this demonstration program. (See article in this issue of MINNESOTA MEDICINE by Dr. Lowrey.)

The clinic organization consists of a psychiatrist (who is the director), a psychologist, and social workers, as well as the necessary clerical assistants.

The study of a child in the clinic involves the following processes: The social worker secures a complete history of the child's life and his background, both social and biological, covering the patient's personality traits, his reactions, the environmental problems to which he has had to adjust.

The child is then given a psychometric examination by the psychologist to arrive at an index

*"The Understanding and Guidance of the Problem of the Child," Child Health Magazine, Vol. V, Nos. 1 and 2, January and February, 1924.

of his innate intellectual endowment. A physical examination follows. The child is then seen by the psychiatrist in order to secure the child's opinion about his problems and to determine the motivating factors in his behavior.

The results of the various examinations are reviewed and combined in a conference of the entire staff. An opinion is formulated concerning the elements in the child's situation which are causing or contributing to the problem, and suggestions are made regarding corrective possibilities and measures.

This program of Child Guidance Clinics is based on the theory that during early childhood personality traits and habits of conduct are developed and established and that they determine the later behavior of the adult. Studies which have been made of adult criminals indicate that in a large number of the offenders habits of reaction existed in early life which seemed to be definite forerunners of the later criminal actions. Many people who are not violators of the law suffer from inability to carry on a stable social life or use their abilities to the best advantage, due to improper training and development of those abilities. By the time an individual has arrived at maturity his attitudes and habits of action are so fixed that comparatively little can be done to modify them, but in the child there is more opportunity to govern the child's personality development through education of the parents, etc.

The services of such clinics are not confined to actually delinquent children only. Nor are they planned for those children who are frankly feebleminded, unless the mental defect is complicated by other factors. The clinics encourage studying children who have any of the ordinary nervous reactions or any symptoms of lack of adjustment to the family, school, or general social situations. It is desired to keep the emphasis on preventive work. The experimental nature of the project is not lost sight of. It is admittedly a new field and as such many of its policies and methods are tentative. One of the most important features is the research nature of the work—that of utilizing the cumulative experience of the clinics to increase the fund of knowledge pertaining to this field of endeavor.

M. L. S.

Note: There are at present three Child Guidance Clinics in Minnesota. The one at the University, organized as the Psychopathic Department of the University Hospital under the direction of Dr. George S. Stevenson with headquarters at Room 133, Millard Hall, is at the service of the state at large. Application forms may be obtained at this office and if the case is considered suitable, appointment is made usually two weeks after the application is received for examination of the child. The examination is usually completed in a day.

Arrangements may be made for a visit of the University Clinic to a community for the examination of a group of fifteen to twenty children.

It is contemplated establishing at least one more permanent but part-time clinic elsewhere in the state.

Minneapolis has its own Child Guidance at the Lymanhurst Hospital under the direction of Dr. Smiley Blanton, and the St. Paul Clinic is under the supervision of Dr. M. L. Stiffler at the Wilder Dispensary.

On Organizations

In a civilization so complex as ours organizations are a prime necessity even though at times the enthusiasm for them becomes almost a passion. Government, religion, industry, commerce, the professions, our social intercourse and many activities of less importance are highly organized and rightly so.

The original purpose of organization was undoubtedly protective. Ten men or a hundred or a thousand with a common weal had a much better chance to survive and perpetuate their ideas if banded together. With the natural development of society, the component parts became more aggressive and adopted not only programs of protection but ventured into more assertive activities and some did this last more sensibly than others.

The medical profession found it very much to its advantage and in many instances necessary for its existence to keep pace with the general development of organization. The American Medical Association with its constituent state and county societies is the result.

No doubt to the rank and file of the profession the A. M. A. is a more or less abstract affair, which publishes scientific journals, runs down and exposes

fraudulent patent medicine manufacturers and holds annual meetings at distant points, where a chosen few are permitted to read dry ultra-scientific papers.

The annual meetings of the secretaries of the various state medical associations held in Chicago for a number of years serves to dispel this view of the limited activities of organized medicine. These meetings serve as a clearing house for constructive ideas regarding increased activities on the part of state organizations for the benefit of members.

At the November meeting of secretaries the question of medical defense was brought up as usual but stress was laid not on the desirability of such a feature in the by-laws of a state constitution, but on ways and means for increasing the value of defense features for physicians. As things stand in Minnesota the medical defense of members of the state association is not a complete defense by any means. Inasmuch as no provision is made for the payment of judgments in case of adverse verdicts, the provident physician is forced to duplicate the partial defense provided by the association and carry private insurance elsewhere. Our state society should provide complete protection or none at all. It is generally admitted by those experienced in malpractice suits that the simple fact that the organization of physicians is defending one of its members prejudices a jury from the start. On the other hand the association should be able to provide insurance of this sort much more reasonably than any private company. The present rate of private insurance in Minnesota, however, is not exorbitant. The subject is being investigated by a committee recently appointed and recommendations will be forthcoming at the annual meeting to be held in Minneapolis in April.

The subject of periodic health examinations had its share of attention at the meeting in Chicago. Our state association has not given this subject the attention it deserves. As a result, the individual members have given little attention to the importance of posting themselves on what constitutes a periodic health examination. Those in doubt would do well to obtain some of the forms gotten up after a good deal of thought and trouble by a committee of the A. M. A. and obtainable now at the Chicago headquarters.

To one who is in doubt as to the advantages of a full time secretary for any state association the size of ours, attendance at one of these meetings of secretaries would dispel such doubt. There are many ways in which a secretary may assist the individual members and the component county societies. Many of our Minnesota societies meet only once in six months. Some counties in Minnesota have only a half dozen physicians and the encouragement to have more frequent meetings, and the grouping of counties into various district societies is important for the medical welfare of physicians in sparsely settled districts. Keeping in touch with legislative activities requires more time than a chairman of a legislative committee can ordinarily devote to such work. If a state association is to include postgraduate extension work throughout the state, the full time of an energetic secretary is essential.

OBITUARY

DR. CARLTON GRAVES

Carlton Graves, member of Minnesota State Medical Association and of American Medical Association, and president of the Aitkin County Medical Society at the time of his death, graduate of the Medical Department of the University of New York, 1878, was the pioneer physician of Aitkin County, having been in continuous practise there since 1882.

He made many long trips by team and sleigh before the railroads came, to the lumber camps of northern Minnesota, on one occasion nearly to the Canadian border where International Falls has since replaced the wilderness, in combating smallpox and other epidemic diseases.

Dr. Graves helped to organize Aitkin County, and served a number of terms as Coroner, Treasurer and Judge of Probate, also as Postmaster at Aitkin, as Surgeon for the Northern Pacific Railway for fifteen years, and as County Health Officer. The latter office he held at the time of his death. He engaged extensively in the logging business, and also in farming, and for many years possessed one of the best herds of Guernsey cattle in the state. His interest in farming and dairying has contributed in no small degree to the development of agriculture in Aitkin County, and he was at the time of his death president of the Aitkin County Farm Bureau.

His success as a physician, his genial personality, and the extent of his activities caused him to be widely known throughout a large section of Northern Minnesota, and his passing will be a cause for regret to all with whom he came in contact.

His death occurred on November 20, after a brief illness from angina pectoris.

J. J. RATCLIFFE,
Secretary Aitkin County Medical Society.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

THE AMERICAN BOARD OF OTOLARYNGOLOGY

The American Board of Otolaryngology was organized in Chicago on November 10, 1924. The following constitute the board of directors: Drs. Harris P. Mosher, Boston, president; Frank R. Spencer, Boulder, Colo., vice president; Hanau W. Loeb, St. Louis, secretary and treasurer; Thomas E. Carmody, Denver; Joseph C. Beck, Chicago; Thomas H. Halsted, Syracuse, N. Y.; Robert C. Lynch, New Orleans; Burt R. Shurly, Detroit; Ross H. Skillern, Philadelphia; William P. Wherry, Omaha. The office of the Board is at 1402 South Grand Boulevard, St. Louis, Missouri.

The board comprises representatives of the five national otolaryngologic associations: the American Otological Society, the American Laryngological Association, the American Laryngological, Rhinological and Otological Society, the American Academy of Ophthalmology and Otolaryngology and the Section of Laryngology, Otology and Rhinology of the American Medical Association. The object of the association is to elevate the standard of otolaryngology, to familiarize the public with its aims and ideals, to protect the public against unqualified practitioners, to receive applications for examination in otolaryngology, to conduct examinations of such applicants, to issue certificates of qualification in otolaryngology and to perofrm such duties as will advance the cause of otolaryngology. The first examination will be held at the time of the meeting of the American Medical Association.

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Officers of the Camp Release District Medical Society for 1925, elected at the annual meeting held in October, are as follows: President, Dr. L. G. Smith, Montevideo; vice president, Dr. A. A. Passer, Olivia; secretary-treasurer, Dr. L. J. Holmberg, Canby.

LYMANHURST AND PARKVIEW STAFF MEETING

The regular monthly meeting of the Lymanhurst and Parkview medical staffs will be held at Lymanhurst School, 1800 Chicago Avenue, Minneapolis, Tuesday evening, January 27, at 7:00 o'clock.

The program for the evening will consist of a symposium on Tuberculosis and Closely Allied Conditions of the Nervous System.

All persons interested in tuberculosis are invited to attend these meetings and participate in the discussions.

LYON-LINCOLN COUNTY MEDICAL SOCIETY

The annual meeting of the Lyon-Lincoln County Medical Society was held at Tracy, Minnesota, October 21, and the following officers were elected: President, Dr. J. L. Jacquot, Tyler; vice president, Dr. B. C. Ford, Marshall; secretary-treasurer, Dr. H. M. Workman, Tracy.

Dr. E. T. Sanderson, Minneota, was elected delegate to the State Medical Association meeting, with Dr. Ward Akester, Marshall, as alternate.

At a meeting of the society held November 24th, a motion was made and carried that the society commend the State Board of Medical Examiners for their action requiring foreign physicians to live one year in the state and declare their intention of becoming a citizen of the United States before appearing before the Board for a license.

MINNEAPOLIS, ST. PAUL AND SAULT SAINTE MARIE SURGICAL ASSOCIATION

The following officers were elected for 1925 at the annual meeting of the Minneapolis, St. Paul and Sault Sainte Marie Surgical Association: President, Dr. Arthur A. Law, Minneapolis; vice president, Dr. David V. Meiklejohn, Fond du Lac, Wisconsin; secretary-treasurer, Dr. John H. Rishmiller, Minneapolis.

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

The annual meeting of the Nicollet-Le Sueur County Medical Society was held Tuesday evening, December 16, 1924, at Le Sueur, Minnesota, with a good attendance.

The election of officers for the coming year resulted as follows: President, Dr. S. Ericson, Le Sueur; secretary, Dr. Geo. T. Baskett, Asst. Supt. State Hospital, St. Peter; treasurer, Dr. F. P. Strathern, St. Peter. Dr. J. E. Le Clerc, the retiring secretary of the society, had served in that capacity for the past twenty years.

Dr. R. M. Phelps, superintendent of the State Hospital at St. Peter, read a paper entitled "Thoughts on Delinquency and Criminality, and Feeblemindedness," which was discussed by Dr. George Baskett.

The society voted to support the plan of a paid field secretary if it could be made feasible.

RAMSEY COUNTY MEDICAL SOCIETY

At the annual meeting of the Ramsey County Medical Society held in November, the following officers were elected for 1925: President, Dr. E. M. Hammes; vice president, Dr. C. C. Chatterton; secretary-treasurer, Dr. A. G. Schulze.

Because of the Tri-State meeting to be held in St. Paul in October, 1925, the annual St. Paul clinic week will be omitted this year.

ST. LOUIS COUNTY MEDICAL SOCIETY

The St. Louis County Medical Society held its annual meeting in Duluth, October 14. The following officers were elected for 1925: President, Dr. F. H. Magney, Duluth; first vice president, Dr. H. H. Hursh, Grand Rapids; second vice president, Dr. D. J. Paradine, Duluth; secretary-treasurer, Dr. Hilding C. Anderson, Duluth.

OF GENERAL INTEREST

On December 3rd a group of Twin City, Rochester and Duluth physicians met at Rochester to organize the Minnesota Society for the Study of Heart Diseases.

Those present were Doctors Henry L. Ulrich and B. J. Clawson, Minneapolis; F. A. Willius and Roy Barnes, of Rochester; E. L. Tuohy, of Duluth, and E. T. F. Richards, R. Edwin Morris and Charles N. Hensel, of St. Paul.

The purpose of this organization is not only for the study of heart diseases but also in the interest of prevention of heart diseases as well.

At a meeting of the Council of the Minnesota State Medical Association held December 19th, various matters pertaining to the Association were discussed and settled. The dates for the annual meeting of the Association in Minneapolis in 1925 were set definitely for Monday, Tuesday and Wednesday, April 27, 28 and 29, inclusive. Dr. E. A. Meyerding of St. Paul was duly appointed secretary of the Association. It was deemed best to have but one secretary of the Association instead of dividing the office into a general and executive secretaryship as heretofore.

The recent epidemic of smallpox in Minneapolis has attracted considerable attention because of its high mortality. A recent report of the State Board of Health is interesting in this connection. It is not generally appreciated that for the past twenty years there have been over 1,200 cases of smallpox in Minnesota yearly. In 1901 and 1902 there were over 8,000 cases each year and in 1920 and 1921 over 6,000 and 9,000 cases respectively. In 1920 there were fifteen deaths reported and in 1921 the deaths were twenty-five. This year the mortality has been much higher than for the past twenty-five years.

The control vaccination exerts over smallpox is nicely illustrated in the Minnesota statistics. In the last ten years although a total of 586 cases developed in individuals successfully vaccinated, within a seven-year period no fatalities resulted. Of the 1,458 cases successfully vaccinated more than seven years previous to contraction of the disease, only one died. Of the total of 108 deaths all but one had either never been vaccinated successfully or no definite history of vaccination was obtainable.

The rôle of vaccination can easily be judged from the above figures. The immunity to smallpox induced by vaccination is of indefinite duration. It doubtless varies in different individuals.

Prof. E. C. Kendall, who has charge of the chemical division of the Mayo Foundation for graduate study and research in medicine, has been given the Chandler medal, awarded annually by Columbia University, for services to science. Dr. Kendall won the medal for isolating the active constituent of the thyroid. He has been associated with the Mayo Foundation and the Mayo clinic since 1911. The Mayo Foundation is an invested principal of more than $2,000,000, given to the University of Minnesota by the Drs. C. H. and W. J. Mayo, the income to be used for graduate study and research in medicine.

Ten thousand prominent individuals throughout the United States are offered the opportunity to get well absolutely free by simply submitting a statement of their ailments to Low S. Tin, apparently a Chinaman, residing in Denver. It seems that herbs which have been used successfully in the treatment of all diseases in China for the past 4,000 years have been entirely overlooked by the medical profession in this country. Now we are to have a demonstration of how this different "system" can cure any known disease. Undoubtedly many will take advantage of this kind offer and try out the system which is new in this country. Report has it that certain Chinese herbalists in California, though not licensed to practice medicine for some reason not apparent, cannot be convicted. In some instances report has it that the stores of these Chinamen serve as blinds for narcotic dissemination.

The Rockefeller Institute for Medical Research has announced the release of the drug known as Tryparsamide for use in the treatment of human and animal trypanosomiasis (African sleeping sickness and *mal de caderas*) and selected cases of syphilis of the central nervous system. This action is based on results reported from clinical investigations which have been in progress for several years. The drug will be manufactured by the Powers-Weightman-Rosengarten Co. of Philadelphia, and will become available through the regular trade channels about January 1, 1925. In releasing the drug for the benefit of the public, the Rockefeller Institute desires it to be known that the Institute does not share in any way in profits that may be derived from the sale of the drug and that, with the cordial co-operation of the manufacturers, provision has been made for the maintenance of a schedule of prices on as low a basis as possible.

Radio broadcasting has actually been begun under the auspices of the Hennepin, Olmsted and Ramsey county societies. Each Thursday evening from 7:45 to 8 o'clock an address by some member of the profession is being broadcast by the Gold Medal radio station, WCCO. The program for the first three months, which began December 18th, will be furnished by the following members of the Olmsted and Ramsey county societies:

1. The goiter question—Dr. Robert Earl.
2. Deafness and hard hearing—Dr. W. W. Lewis.
3. The *x*-ray in medicine and surgery—Dr. R. D. Carman.
4. Advances in preventive medicine—Dr. George D. Brand.
5. The state hospital for crippled children—Dr. Wallace Cole.
6. Wearing glasses—Dr. Frank E. Burch.
7. One thousand years of surgery—Dr. Donald C. Balfour.
8. Focal infections—Dr. George Earl.
9. The value of animal experimentation to humanity—Dr. C. H. Mayo.
10. The value of periodical medical examinations—Dr. Thomas Dickson.
11. Care of the adolescent child—Dr. E. M. Hammes.
12. The undernourished child—Dr. Ray Shannon.
13. Blood pressure—Dr. Edgar Hermann.
14. Tuberculosis—Dr. E. K. Geer.

NEW AND NON-OFFICIAL REMEDIES

The following articles have been accepted by the Council on Pharmacy and Chemistry:

HOFFMAN-LAROCHE CHEMICAL WORKS:
Secacornin
Thigenol

INTARVIN CO., INC.:
Intarvin

ELY LILLY & CO.:
Ampules Ouabain, 0.0005 Gm. (1/128 Gr.)-Lilly
Hypodermic Tablets Strophanthin 1/100 Gr.-Lilly
Hypodermic Tablets Strophanthin 1/120 Gr.-Lilly
Iletin (Insulin-Lilly) U-80

MERCK & CO.:
Benzyl Succinate-Merck

PARKE, DAVIS & CO.:
Ampules Adrenalin Chloride Solution Rx 1, 1:10000, 1 c.c.
Ampules Adrenalin Chloride Solution Rx 2, 1:2600, 1 c.c.
Ampules Adrenalin Chloride Solution 1:1000, 1 c.c.

SHARP AND DOHME:
Hypodermic Tablets Strophanthin (1/200 Gr.)-S. and D.
Ergotole
Ampules Ergot, 1 c.c.

E. R. SQUIBB AND SONS:
Insulin-Squibb, 10 Units
Insulin-Squibb, 20 Units

SWAN-MYERS CO.:
Sterile Ampules Mercuric Potassium Iodide, 0.017 Gm. (¼ Gr.)-Swan-Myers

SYNTHETIC DRUG CO., INC.:
Compressible Capsules Mercury Salicylate "Synthetic," 1 Gr. for Intramuscular Injection
Compressible Capsules Mercury Salicylate "Synthetic," 1½ Grs. for Intramuscular Injection
Compressible Capsules Mercury Salicylate "Synthetic," 2 Grs. for Intramuscular Injection

WINTHROP CHEMICAL CO.:
Novasurol
Novasurol Ampules

Schick Test-Lederle.—(New and Non-official Remedies, 1924, p. 335.)—A diphtheria immunity test, also marketed in packages of one vial containing diphtheria toxin sufficient for 50 tests; in packages of one vial containing diphtheria toxin sufficient for 100 tests. Lederle Antitoxin Laboratories, New York.

Antidysenteric Serum-P. D. and Co.—(New and Non-official Remedies, 1924, p. 301.)—An antidysenteric serum, also marketed in packages of one syringe containing 20 c.c. Parke, Davis & Co., Detroit.

Barbital-Merck.—A brand of barbital-N.N.R.—(New and Non-official Remedies, 1924, p. 62.)—Merck & Co., New York.

Barbital Sodium-Merck.—A brand of barbital sodium-N.N.R.—(New and Non-official Remedies, 1924, p. 63.)—Merck & Co., New York.

Carbon Tetrachloride-Merck.—Highest Purity "C.P."—A brand of carbon tetrachloride medicinal-N.N.R.—(New and Non-official Remedies, 1924, p. 84.)—Merck & Co., New York.

Cargentos Ointment, 5 Per Cent.—An ointment composed of cargentos (formerly marketed as cargentos new process, New and Non-official Remedies, 1924, p. 343), 1 part; anhydrous woolfat, 19 parts. The H. K. Mulford Co., Philadelphia.

Cargentos Capsules, 3 Grs.—Capsules, each containing cargentos (formerly marketed as cargentos new process, New and Non-official Remedies, 1924, p. 343), 3 grains. The H. K. Mulford Co., Philadelphia.

Diphtheria Toxin-Antitoxin Mixture New Formula (Park Banzhaf's, 0.1 L+ Dose).—A diphtheria toxin-antitoxin mixture (New and Non-official Remedies, 1924, p. 293), each c.c. of which constitutes a single dose, and contains 0.1 lethal dose of toxin properly neutralized with the necessary amount of diphtheria antitoxin; marketed in packages of three 1 c.c. vials representing one immunizing dose; in packages of thirty 1 c.c. vials representing ten treatments; also in packages of one 30 c.c. vial representing ten treatments of three doses each. The H. K. Mulford Co., Philadelphia. (Journal A. M. A, Nov. 1, 1924, p. 1431.)

Nutrivoid Flour.—A vegetable product composed chiefly of unassimilable carbohydrates (Mannans). It contains fat, 0.92 per cent; protein, 4.31 per cent; nonutilizable carbohydrates, 85.37 per cent. Nutrivoid flour is used as a means of filling out restricted diets, as in the Allen treatment of diabetes. It is a non-nutritive food substance used to give bulk to foods, thus serving to satisfy hunger without furnishing nourishment. Nutrivoid Diabetic Flour Co., New York.

Insulin-Squibb.—A brand of insulin (New and Non-official Remedies, 1924, p. 149). It is supplied as insulin-Squibb 10 units (5 c.c. vials containing 10 units in each c.c.), and insulin-Squibb 20 units (5 c.c. vials containing 20 units in each c.c.). E. R. Squibb and Sons, New York. (Journal A. M. A., Nov 8, 1924, p 1509.)

Lacto-Dextrin.—A mixture composed of lactose, 73 per cent; dextrin, 25 per cent, and desiccated lemon juice, 2 per cent. The administration of lacto-dextrin is proposed as a means of promoting the growth of the normally present aciduric organisms B. acidophilus and B. bifidus in the alimentary tract, so as to make them the predominating organisms. It is claimed that this increased growth of acidophile organisms prevents the undue development of putrefactive bacteria and their products. It is claimed that this change in the character of the intestinal flora brings about increased intestinal activity and that this in turn prevents or ameliorates certain conditions commonly ascribed to putrefactive products in the colon. Battle Creek Food Co., Battle Creek, Mich.

Pituitary Extract-Lilly (Obstetrical).—A slightly acid aqueous solution containing the water-soluble principle or principles of the fresh posterior lobe of the pituitary body of cattle. It is tested for oxytocic action on the isolated uterus of the virgin guinea-pig against a standard solution prepared from defatted desiccated posterior lobe powder and adjusted so that its strength is

equal to that of a 5 per cent solution of the fresh posterior lobe of the pituitary gland. For a discussion of the actions and uses, see general article, Pituitary Gland, New and Non-official Remedies, 1924, p. 225. Pituitary extract-Lilly (obstetrical) is marketed in ampules containing 0.5 c.c. and 1 c.c., respectively. Eli Lilly & Co., Indianapolis.

Pituitary Extract-Lilly (Surgical).—A slightly acid aqueous solution containing the water-soluble principle or principles of the fresh posterior lobe of the pituitary body of cattle. It is tested for its pressor action on the blood pressure of mammals and for oxytocic action on the isolated uterus of the virgin guinea-pig against a standard solution prepared from defatted, desiccated posterior lobe powder and adjusted so that its strength is equivalent to that of a 10 per cent solution of the fresh posterior portion of the pituitary gland. For a discussion of the actions and uses, see general article, Pituitary Gland, New and Non-official Remedies, 1924, p. 225. Pituitary extract-Lilly (surgical) is marketed in ampules containing 1 c.c. Eli Lilly & Co., Indianapolis.

Culture Bacillus Acidophilus-Medical Laboratories, Inc.—A broth culture of *Bacillus acidophilus* in bottles containing about 120 c.c. It contains from 250 to 500 million of viable organisms *(B. acidophilus)* per c.c. at the time of sale. For a discussion of the actions and uses, see Lactic Acid-producing Organisms and Preparations (New and Non-official Remedies, 1924, p. 169). Medical Laboratories, Inc., New York. (Journal A. M. A., Nov. 15, 1924, p. 1589.)

Intarvin.—An artificial fat made from fatty acids having an odd number of carbon atoms. Intarvin is composed of the glyceryl esters of margaric acid admixed with small quantities of the glyceryl esters of pentadecylic, palmitic and stearic acids, 82 per cent; liquid petrolatum, 12 per cent; water, 6 per cent. Intarvin is proposed for use in diabetes mellitus on the ground that fatty acids containing an odd number of carbon atoms do not yield ketone bodies on oxidation in the normal or diabetic organism, and that for this reason it may with advantage replace the natural fats in the diet. The evidence indicates that intarvin does not increase the production and may reduce the production of ketones in certain cases; that it has a protein-sparing action; that sugar is formed from it in small amounts only; that it has little, if any, beneficial effect on carbohydrate metabolism in the human organism; that its unpalatable taste is a drawback to its use, and that it may prove useful in the treatment of diabetes in certain cases. Intarvin Co., Inc., Long Island City, N. Y.

Quinine Ethyl Carbonate-P. W. R.—A brand of quinine ethyl carbonate-N.N.R.—(See New and Non-official Remedies, 1924, p. 267.) Powers-Weightman-Rosengarten Co., Philadelphia. (Journal A. M. A., Nov. 22, 1924, P. 1685.)

Secacornin.—Ergotin-Roche.—A solution of the active principles of ergot in a menstruum consisting of distilled water, glycerin and 7.5 per cent of alcohol. One c.c. secacornin corresponds to 4 gm. ergot, U. S. P. The actions and uses of secacornin are the same as those of ergot. It may be given by intramuscular injection. Hoffmann-LaRoche Chemical Works, N. York. (Journal A. M. A., Nov. 29, 1924, p. 1769.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of Nov. 12, 1924

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, November 12, 1924, at 8 o'clock. The meeting was called to order by Dr. Hamilton, in the absence of the president and vice president. There were 29 members and 2 visitors present.

The minutes of the October meeting were read and approved.

The following resolutions were read by Dr. Arnold Schwyzer in memory of Dr. Archibald MacLaren:

IN MEMORIAM

Dr. Archibald MacLaren

The members of this Academy, who attended our State Medical Society meeting in St. Cloud, are aware of the deep gloom that was cast over the convention because its President, Dr. Archibald MacLaren, was not able to preside on account of serious illness. The whole profession of the state, as well as the public, was shocked a few days later to hear of his death.

Measured by the highest standards known to our profession, Dr. Archibald MacLaren always occupied a foremost place in medical ethics and progress. He will continue to be so regarded by those who follow him.

Few members of our profession ever obtained such unbounded confidence of their comrades as that enjoyed by Dr. MacLaren. He was wise in counsel, competent and able in the application of surgical and medical measures.

His contributions to surgical literature were always of the highest merit, extremely practical and richly instructive, in which he never hesitated to point out his own mistakes.

He was a successful and stimulating teacher, as hundreds of the graduates of the Medical Department of our University and scores of internes of our hospitals will gladly testify.

Dr. MacLaren took the keenest interest, and kept himself richly informed, in the progress of all science, especially the sciences collateral to those of medicine and surgery, thus making him the broad and liberal-minded man that we knew.

In church, state and medical affairs he was universally trusted on account of his sincerity of purpose and absolute integrity. He enjoyed the confidence of the public as much as that of his own profession.

He demonstrated his loyalty to his country, by offering his services in times of war and performing the duties of Surgeon General of the State.

He was not only one of the originators of this Academy, but one of its staunchest and most faithful members.

The Minnesota Academy of Medicine takes this opportunity to express its keen appreciation of what Dr. Archibald MacLaren has done for it and for the medical societies throughout the nation, and to express their deepest sympathy to his family for the loss which they have sustained.

(Signed): Arnold Schwyzer, M. D.,
H. B. Sweetser,
John F. Fulton, M.D., Chairman,
Committee.

These resolutions were accepted by a rising vote, and a motion was carried that they be spread on the minutes and a copy sent to the medical journals and to the family.

Dr. S. E. Sweitzer showed several lantern slides of smallpox patients at the General Hospital, after which there was a short discussion of the present smallpox situation.

Dr. Wm. R. Murray (Minneapolis) then read his inaugural thesis, entitled, "Visual Field Changes in Normal Pregnancy." Numerous lantern slides were shown.

DISCUSSION

Dr. Burch: I have enjoyed Dr. Murray's paper very much and I think he has done a fine piece of research work. I once started to try to get some material for this same study, but so many patients in late pregnancy had normal vision that they did not care to come in to have fields taken and I got little co-operation.

One of the noteworthy facts revealed in this series is: That with the quite uniform contraction of the fields as shown, occurring in approximately nine-tenths of the patients during the last weeks of pregnancy with quite uniform concentric contraction, evidencing considerable pressure, there should be such infrequent evidence of impairment of central vision. In these enlargements of the pituitary gland, the effect of hypertrophy upon the vision is entirely due to mechanical pressure on the overlying chiasm. Therefore, it seems remarkable in this series and in the series published by Dr. Finley and by Dr. Carvill that there should be so very few reports of involvement of the papillo-macular bundles of the optic nerves. This seems to escape involvement in most cases. Dr. Murray, I think, showed only one in which there was a definite scotoma. One would expect, with marked contraction, that this very sensitive portion of the nerve supplying central vision would become involved.

Another outstanding feature is that the primiparæ, in whom the gland is not nearly so enlarged as in the multiparæ, show quite as markedly contracted fields as do the multiparæ. This notwithstanding the statistical evidence that there is practically twice as much enlargement of the gland in multiparæ as in primiparæ.

Whether all cases of hyperplasia of the pituitary gland remain physiological is, perhaps, not proven. I have seen two reports of cases with permanent hypophysis disease following pregnancy, and this leads to the question whether physiological hyperplasia may not become pathological at times, more frequently than we know.

This thesis is a real contribution to the subject of hypophysis disease, or, at least, the physiological changes which occur during pregnancy and their effects upon vision.

Dr. Fulton: Dr. Murray has demonstrated by his paper tonight that he is an acquisition which this Society should have obtained many years ago. He has brought out some new points in his paper. He has brought out the fact that there is concentric contraction as well as bi-temple. He has also demonstrated that recovery may be slow after parturition. I have seen one report published in which hypertrophy of the gland remained permanent. Dr. Finley, of Cuba, read a paper on this subject before the International Ophthalmologists' Congress in Washington. He said that when he started on this investigation he thought it was something new, but he found, on looking up the literature, that other investigators had worked it up with similar findings. It came out in the discussion that Dr. Lancaster and Dr. Maud Carvill, of Boston, had been working along this line with about the same results.

This paper of Dr. Murray's is a highly meritorious one.

Dr. A. Schwyzer: It may seem queer that one not an oculist should discuss a paper of this kind, but it involves physiology, points between physiology and pathology, and it involves obstetrics. What impressed us all was the enormous contraction of the visual fields. This contraction came on in the later months of pregnancy and lasted at times from four to six months after the delivery. In multiparæ you seem to have more swelling of the pituitary gland; still, most of the worst cases of contraction of the visual field were in primiparæ.

If you consider the increase of the gland—about 0.3 of a gram, representing a volume of about 4 drops of water—it is difficult to understand how this little increase in the size of the hypophysis should press on the chiasm. I noticed that the reduction of the field was at times much more from above and also from below. In fact, the constriction was in the main circular. There may be an explanation for this, other than pressure on the chiasma.

We know from the physiology of pregnancy that there is a great activity in the cerebral membranes, especially in the dura. We know that there occurs such a succulence and hyperemia in the dura from congestion, that we have at times an apposition of bone on the inside of the skull, especially anteriorly. This occurs in the later months of pregnancy and especially in younger persons, i.e., primiparæ. If the dura can become so much congested that it causes an apposition of bone, forming distinct plaques, could it not be that here we have the cause of the circular reduction of the optic field, by a pressure or another influence on the optic nerve at the optic foramen? It would explain why it takes several months for the recovery to normal, while the pituitary gland returns to normal very promptly after the child is born. Could it not be that the trouble is at the foramen opticum, where the leptomeninges and the dura meet and envelop the nerve? This appears, prima facie, more probable than that the slight increase of the strongly encapsulated pituitary should damage the chiasma, which lies very free above the fibrous capsule of the pituitary and may well be lifted a trifle without any consequence. In tumors of the pituitary with changes in the bony structures of the sella turcica we have, of course, an entirely different mechanism, which consists of a considerable expansion of the bony structures and a vastly greater increase of the size of the pituitary.

Dr. Litzenberg: I thought when the theory of pressure from the pituitary gland was advanced as the cause of this condition, that we might have something akin to the enlargements of the other endocrine glands during pregnancy. The thyroid always enlarges in pregnancy and never quite goes back to normal. In each succeeding pregnancy this enlargement recurs and does not go back to its size before the pregnancy. The suprarenals are stimulated, and we have the corpus luteum of pregnancy in the ovary; but the one that we can study the best is the thyroid. There cer-

tainly is definite evidence that enlargement of the hypophysis takes place in this disturbance of pregnancy.

According to the theory of pressure by the gland, Dr. Murray's conclusions should have been different, but he had to make his conclusions according to his findings. If pressure were the only factor, then the field ought to remain smaller by virtue of this organ never going back to normal.

We will have to look some other place for an explanation of these visual field changes. I don't know but perhaps Dr. Schwyzer's explanation may be at least a hint as to where to look for the explanation. It does not seem to me that the mechanical enlargement of the gland is the only explanation. There may be some physiological change in the pituitary which offers an explanation.

DR. BURCH: I would like to ask Dr. Litzenberg if he does not sometimes find acromegalic symptoms in some cases of pregnancy.

DR. LITZENBERG: They are rather rare, but they do occur.

DR. FULTON: I would like to ask Dr. Murray what percentage of cases have impaired visual fields.

DR. MURRAY (in closing): Every one that I have examined. I do not know that I have very much more to say in conclusion. Dr. Burch mentioned that the papillo-macular bundle does not seem to be affected and yet it is supposed to be the most sensitive of all the fibres of the optic nerve. Perhaps the anatomical location of the papillo-macular bundle has something to do with the explanation. It is the central portion of the optic nerve; it is well within the substance of the optic nerve, and that may protect it to a certain extent.

In regard to Dr. Schwyzer's theory that this may be due to pressure in the optic foramen, I don't believe that it is definitely established that these changes are due to pressure on the optic nerves. If pressure occurs at the optic foramen, then we would expect to find a very marked difference in the two fields. If you will recall the fields shown here, you will remember that we get pretty nearly symmetrical contraction in both eyes. The pressure is apparently on the fibres of each optic nerve and we find a change more or less symmetrical in each eye.

In regard to the return of the fields to normal following parturition, the cases which have been published would give one the idea that all of these cases return to normal within eight or ten weeks. These cases shown tonight do not show it. Some of these cases, as late as four months, show very marked contraction.

These cases show that the fields are more contracted in primiparæ than in multiparæ, whereas you would expect just the reverse. It may be that in the primipara, where that nerve has not yet been subjected to pressure by the pituitary gland, it is more sensitive; the fields of the primipara thus showing more contraction.

DR. EMIL GEIST (Minneapolis) read a paper entitled, "The Accessory Scaphoid Bone." Lantern slides were shown.

The meeting adjourned.

JOHN E. HYNES, M.D.,
Secretary.

PROGRESS

Abstracts to be submitted to Section Supervisors.

Members are urged to abstract valuable articles which they run across in their reading and send the abstracts to the physicians in charge of the respective sections. In order to avoid duplication it would be well to communicate with one of the section supervisors before the article is abstracted.

MEDICINE

SUPERVISORS:
F. J. HIRSCHBOECK,
FIDELITY BLDG., DULUTH
THOMAS A. PEPPARD,
LA SALLE BLDG., MINNEAPOLIS

THE VALUE OF THE TRUDEAU SANATORIUM'S FIVE DIAGNOSTIC CRITERIA OF PULMONARY TUBERCULOSIS IN NEGATIVE DIAGNOSIS: Lawrason Brown and Fred H. Heise (Amer. Rev. of Tuberculosis, July, 1924). In a previous paper (American Review of Tuberculosis), the writers have discussed this subject, but in the present communication report the verification of their conclusions at that time by a follow-up study of 264 cases with which they have kept in touch for periods varying from one to seven years. The five criteria are: (1) The history of an hemoptysis of a teaspoonful or more; (2) the occurrence of pleurisy with effusion, (3) the presence of persistent moderately coarse râles in the upper half of the chest, (4) a definite parenchymatous *x*-ray lesion of a tuberculous character in the upper half of the chest and (5) tubercle bacilli in the sputum.

When none of the five criteria was present, pulmonary tuberculosis was said to be excluded. When an hemoptysis occurred of more than a teaspoonful or a pleurisy with effusion without the other criteria a diagnosis of "suspected" pulmonary tuberculosis was made. When both occurred a positive diagnosis was made. The presence of râles without other evidence called only for a diagnosis of "suspected tuberculosis." A parenchymatous *x*-ray lesion unaccompanied by symptomatic evidence of activity of the disease meant "non-clinical" pulmonary tuberculosis. Subjective symptoms were not used as a basis for diagnosis, but were considered as indicating activity of the disease.

Approximately 2,000 cases were discharged from the Trudeau Sanatorium from 1916 to 1923. In 61 cases the diagnosis was in doubt and in 203 it was negative. In none of the 203 did demonstrable pulmonary tuberculosis develop subsequently unless the occurrence of hemoptysis in three patients (1.5) may be considered as an indication of such development without further corroborative evidence.

In the group of 61 "suspected" cases only two subsequently developed pulmonary tuberculosis, yet temporary râles were heard in 11 cases and permanent râles in seven. Parenchymatous *x*-ray changes slight in extent and atypical

of tuberculosis were found in 12. Eleven cases gave a history of positive sputum previous to their entrance into the sanatorium which was not verified. Twenty-nine of 44 suspected cases reacted constitutionally and 13 focally, but as noted only two of the entire group of sixty-one suspected cases developed demonstrable clinical tuberculosis.

Besides the 264 negative or suspected cases, 11 were diagnosed as "non-clinical tuberculosis," that is, tuberculous without signs of activity. Three of these failed to react to a repeated subcutaneous dose of 10 m.gm. of O.T. Some had temporary râles at base or apex or slight parenchymatous changes in the *x*-ray plates. Seven have been discharged less than a year. The others have remained well.

In conclusion, the writers believe that too much stress is placed on toxic symptoms as a basis of diagnosis rather than activity. A patient who fails to react to a repeated dose of 10 mg. of old tuberculin (O.T.) rarely develops active pulmonary tuberculosis.

When the five diagnostic criteria are absent we can safely say that the patient does not have clinical pulmonary tuberculosis.

ARTHUR T. LAIRD

CASES OF MARKED HYPERTENSION, ADEQUATE RENAL FUNCTION AND NEURORETINITIS: Wagener & Keith (Arch. of Int. Med., Sept., 1924). In their work at the Mayo Clinic the authors have recognized a condition which they designate as a distinct entity in cardiovascular disease, and characterized by extreme hypertension, adequate renal function and neuroretinal changes. They differ from Volhard & Fahr in that they apply the term "malignant" hypertension not to those cases of vascular sclerosis which later develop renal insufficiency, but rather to those severe, diffuse vascular cases which do not show renal inadequacy.

The term "malignant" is deserved because of the frequent loss in weight, the dominance of cerebral symptoms and accidents, extreme high blood pressure, severe neuroretinitis, and a serious prognosis.

Volhard & Fahr likewise have applied the term "malignant" hypertension to a class of cases considerably older in average years than the cases cited by Wagener and Keith, which fall more particularly into the age incidence of so-called "essential" hypertension, the difference being the extreme hypertension, tendency to cerebral complications and the retinal changes, with or without evidences of moderate renal dysfunction.

These conditions differ from chronic glomerular nephritis in their high pressure, the absence of anemia, absence of azotemia, and the absence of extensive, diffuse, pathologic lesions in the kidneys.

Renal malfunction in these cases is never severe, although a trace of albumin and a few casts may be apparent. The metabolic alterations are not sufficient to produce abnormal s. mptoms.

One of the characteristic evidences of this condition is the severe hemorrhagic and exudative neuroretinitis, which does not usually assume the "snowbank" type nor the macular stars and the extent of the retinitis found in true nephritic cases.

The prognosis in these cases was extremely serious, and eleven patients died within fifteen months of their initial examination at the clinic, only one remaining alive at the present time.

The cerebral symptoms were sufficiently severe to suggest the possibility of cerebral tumor in three cases. In one case a craniotomy failed to reveal a tumor, but necropsies were not permitted to verify the diagnosis.

The determining factor in the production of severe retinitis is not known, but it has been suggested that it occurs with marked contraction of smaller vessels. The course is chronic, and seems to be little influenced by treatment. The extent of visual disturbance depends on the amount of edema present in the macular area, but vision is usually surprisingly good. The authors assume that if the patient lives long enough the retinitis probably heals ultimately, with varying degrees of post-neuritic atrophy, and consequently varying degrees of loss of vision.

The ophthalmoscopic picture may be the earliest evidence of the conversion of an essential into a malignant hypertension, and reveal a serious vascular lesion.

The term "malignant" hypertension in these instances is probably confusing, not because it is inappropriate to call these cases malignant but because of the confusion of the term with the terminology of Volhard & Fahr, which is more or less generally recognized, if not so generally accepted.

F. J. HIRSCHBOECK.

THE PREVENTION AND TREATMENT OF DIGESTIVE DISORDERS OF TUBERCULOUS PATIENTS: John L. Kantor (The American Review of Tuberculosis, 1924, ix, 430). After a discussion of the treatment of malnutrition and the anorexia which usually accompanies it, the writer outlines the symptoms and management of the following digestive disorders: Dyspepsia of Phthisis, Early form; Gastricatony and Delayed Gastric Emptying; Tuberculosis of the Intestines, Primary form; Secondary Intestinal Tuberculosis; Perirectal Tuberculosis.

In the early dyspepsia of phthsis there is no organic change in the digestive tract and the symptoms are due to increased irritability of the stomach and bowel. The principles of treatment applicable to any digestive neurosis are here applicable, namely rest, general and local, and general toning up of the automatic nerve control of digestion. Not only appropriate drugs but proper psychotherapy, hydrotherapy and physiotherapy enter into this treatment. For the annoying emetic cough absolute quiet after meals is necessary. The patient must exert his will power to control it. In the gastric atony and delayed emptying of the advanced stages of tuberculosis the author suggests (1) Prevention of gastric distention by limiting the amount of fluid with meals and the use of a concentrated dry diet. (2) Administration of hot water when the stomach is most likely to be empty, as on arising. (3) Aspiration of stagnating

contents followed by brisk lavage about once a week or oftener.

Primary tuberculosis of the intestines is not uncommon in childhood and has a better prognosis than the secondary type of the disease. The author does not favor surgical intervention but recommends a medical treatment consisting principally of absolute rest in bed. In addition systematic heliotherapy is employed.

Despite the fact that manifest tuberculous enteritis is commonly regarded as a precursor of a fatal issue there is very definite evidence that tuberculous ulcers may heal under favorable circumstances. For prophylaxis the author recommends the following measures:

1. The swallowing of tuberculous sputum must be avoided. 2. Hydrochloric acid should be administered in full doses in the subacidity cases. The best way to administer it is to order it sipped (20 to 30 minims in half a glassful of water) during the whole of each meal time. 3. Intestinal stasis should be avoided. This is most apt to occur in the ileo-colic region. The various forms of constipation (atonic, spastic, rectal, due to redundant colon, etc.) must be recognized and intelligently healed. 4. Every case of diarrhea should receive prompt and serious attention. The patient should be put to bed, given a bland, well balanced diet and have warm applications to the abdomen. In some cases irrigations and trans-intestinal flushes may be of value. The Schmidt intestinal test diet is recommended.

A. T. LAIRD.

SYPHILIS AS THE CAUSE OF MUSCULAR ATROPHY OF SPINAL ORIGIN: Ostheimer & Wilson (Amer. Jour. of Med. Sci., June, 1924). Leri, in 1921, made the statement that progressive amyotrophies are most commonly, if not always, syphilitic in origin. Pierre Marie, in 1897, questioned whether there was such an entity as chronic anterior poliomyelitis of a primary nature. In 1905, Dana inferred that nearly all the atrophies were due to parasyphilitic processes, and pointedly remarked that in the early investigation of the syphilitic origin of tabes rather modest statistics were advanced in its support. American text books have not been so enthusiastic in the reception of this view, but Spiller states that there is no objection in accepting syphilis as the possible cause, at least, of primary lateral sclerosis or progressive spinal muscular atrophy. Church and Peterson point out the relative frequency of positive Wassermann tests in these cases. White and Jelliffe do not specifically mention syphilis as the cause.

The authors report five cases of progressive muscular atrophy, all of which conclusively proved to be syphilitic in origin.

They make a plea for a wider recognition of syphilis as the possible cause of amyotrophic conditions, and suggest the reporting of all cases of the amyotrophic form of spinal syphilis, even if associated with tabes dorsalis or paresis. It is suggested that the association is more than casual, and the knowledge derived from a study of these cases, if positive, will, in becoming generalized, lead to the prompt and immediate institution of anti-luetic treatment, just as it is employed today in tabes dorsalis and paresis.

F. J. HIRSCHBOECK.

SURGERY

SUPERVISORS:
DONALD K. BACON,
LOWRY BLDG., ST. PAUL
VERNE C. HUNT,
MAYO CLINIC, ROCHESTER

SIMPLE EXCISION IN CERTAIN CASES OF DUODENAL ULCER: LeGrand Guerry (Surg., Gyn. and Ob., Vol. 39, No. 3). Duodenal ulcers should be excised whenever possible, excision being sound in basic principle, as it removes the diseased area.

In doing a simple excision, the pyloric sphincter should not be divided unless there is some reason for it, such as when the resultant suture line is in such close proximity to the sphincter that the sphincter action retards rapid healing. In this type of operation the rest of the duodenal mucosa can readily be explored, and should secondary or other ulcers be present, they can be taken care of at the same time. There is no interference with the segmental activity of the stomach in this procedure.

No one operation is suitable in all cases of duodenal ulcer and no one operation will cure all cases.

The author concludes that while he has not done a great number of these operations, the cases in which he has made excision of the ulcer have had very satisfactory results.

W. P. HERBST.

RESTORING LUMEN IN IMPERMEABLE ESOPHAGEAL STRICTURE: King (Surgery, Gynecology and Obstetrics, Nov., 1924). A truly impermeable stricture of the esophagus is uncommon. Many strictures so designated are really not impassable, for while they fail to respond to ordinary bouginage, they later are passed by string swallowing or some other method.

A stricture which completely occludes the lumen of the esophagus and resists all efforts at bouginage is best and most safely treated if it is located at the upper or lower end. The external surgical treatment of strictures of the middle esophagus is fraught with great danger. The technique is very difficult and up to the present time the mortality rate has been exceedingly high. At this time treatment through the esophagoscope gives the best results, and the author presents a case of an impermeable stricture successfully treated by a new method. One esophagoscope was passed from above through the mouth and one from below through an opening in the stomach. The ends were brought as nearly together as possible at the site of the stricture and long biting forceps were used through the upper endoscope to pass through the stricture into the mouth of the lower esophagoscope. All of this was done under close observation through the fluoroscope. Following this a string was passed and the esophagus was gradually dilated successfully by bougies.

J. W. STINSON.

THE PREVENTION OF ACUTE INTESTINAL OBSTRUCTION: Cyrus F. Horine (Ann. of Surg., July, 1924). To reduce the mortality in acute intestinal obstruction, an early diagnosis is necessary and this must be followed by surgical relief before the patient becomes toxic.

Since the beginning of intestinal surgery, the mortality of acute intestinal obstruction has remained almost constant, and not until the cause of the toxemia is controlled can one hope for a lower death rate in these cases.

The author has made a study of 107 cases of acute intestinal obstruction at the Maryland University Hospital, 56 of which died.

This death rate approximates closely the death rate of 840 cases collected by other operators. (Finney, Deaver, Ross and Flint.)

After studying the causes of obstruction in the various laparotomies, the author feels that drainage predisposes to obstruction, especially the drainage in mid-abdominal or rectus incisions. Also drainage in the lower abdomen is more of a predisposing factor than drainage of the upper abdomen because the coils of intestine are permitted to encircle the drains or organized bands and become obstructed.

In definite cases of acute appendicitis and those in which drainage is likely, he feels that a McBarney incision is the one of choice and should the rectus incision be used, he feels that drainage should be made laterally through a stab wound.

In conclusion, he believes that the prevention of a great many cases of obstruction may be obtained by more conservative drainage of the abdominal cavity.

L. D. POWELL.

ABSTRACT OF EXSANGUINATION-TRANSFUSION: L. Bruce Robertson (Arch. of Surgery, July, 1924). The removal of large amounts of blood in various toxemias, with immediate replacement by citrated blood from a healthy donor, has become an established procedure in the treatment of burn toxemia, erysipelas, acute intestinal intoxication and septicemia, by Robertson, who has performed it over 500 times. The more complete the replacement of the patient's blood with fresh blood the more prompt and lasting is the result, and the necessity therefore for using large amounts of blood precludes the use of the method in adults. It is desirable to secure at least as much blood as it is estimated the child's circulation contains. It is assumed that there are roughly 35 c.c., or a little over one ounce, of blood per pound of body weight. The blood is withdrawn from the donor into 100 c.c. syringes, each containing 10 c.c. of freshly prepared 3.5 per cent sodium citrate solution. This is obtained in advance and kept in a water bath at a temperature of 100 degrees F.

The cannula for the transfusion is tied into a suitable vein, such as at the ankle or elbow, and salt solution is slowly introduced to prevent clotting. The exsanguination cannula is inserted into the superior longitudinal sinus in small infants, or into the femoral vein in older children. In the latter case, a large cannula is introduced into the femoral vein through the saphenous vein, just before it perforates the cribiform fascia.

Blood is withdrawn from the patient until signs of exsanguination begin; this varies in small children from 60 to 160 c.c. With the first sign of weakening pulse, the donor's blood is injected. Thereafter withdrawal and introduction of blood continue simultaneously until all the available blood has been transfused. If the circulation permits, 100 to 150 c.c. more blood is introduced than is removed.

Toxemia from severe burns and scalds, under this treatment, is claimed to have responded better than under any previous method. Many cases which have developed convulsions, formerly usually fatal, have recovered where this treatment has been employed.

Erysipelas, particularly in very young infants, with a mortality of nearly 100%, has been much more successfully treated by this method.

Acute intestinal intoxication, with a mortality of 66% under the usual treatment, has shown a decrease to 42% where this method was employed. Better results were obtained in the later cases, where a larger amount of blood was replaced, and the treatment instituted earlier in the course of the disease.

Drug poisoning was treated in two cases of resorcin poisoning. These were young infants, suffering from severe eczema, treated with 8 per cent resorcin ointment. Three days after this was begun, the babies suddenly collapsed; convulsions and coma developed; carboluria was present. Both cases recovered promptly when exsanguination-transfusion was performed.

Malignant scarlet fever showed a marked improvement in 24 hours after this treatment was used, the toxic symptoms responding promptly.

Septicemia gave fair results, but the number of cases was too small to draw accurate conclusions from.

THOMAS MYERS.

SURGICAL TREATMENT OF TUBERCULOSIS: Everett E. Watson (American Review of Tuberculosis, 1924, x, 9). Dr. Watson reports eight cases in which operative procedures were carried out on the chest of eight tuberculosis patients at Mount Regis Sanatorium, Salem, Virginia. In two cases practically the entire bony thorax on the affected side was removed. One patient is in good condition but has a slight drainage from the wound after seven years. The other patient died after two years, having shown some temporary improvement. Two cases of intrapleural pneumolysis were only partially successful. The sixth to the tenth ribs on the affected side were completely removed in another case. This patient is now at work and apparently in good health. Posterior rib resection was carried out for three more patients, all of whom showed some improvement.

The author recommends the posterior operation in preference to the old and more extensive methods, inasmuch as the mortality is lower and a great part of the operation can be done under local anesthesia. Thoracoplasty cannot supplant artificial pneumothorax, since the latter allows a return of function to the diseased lung.

A. T. LAIRD.

SOME PROBLEMS OF DRAINAGE: Sir Henry M. W. Gray (Surg., Gyn. & Ob., Aug., 1924). In this paper the author discusses the fact that some surgeons do not give enough credit to a patient's natural recuperative powers in cases of abscess formation and drainage is employed more frequently than he believes necessary.

The actual pathological process of localized infection is given in detail and the various forces discussed which come into play to overcome an invading infection. Various complications may arise in drained cases, i.e., sloughing of skin, vessels, bowels, etc. The drainage tube itself may cause (1) collections of bacteria in recesses around the tube, (2) a localized irritation with the formation of a seropurulent exudate prolonging the actual drainage, (3) infection may travel down the tube from the surface. When operating upon an abscess it is best to make the incision large enough to establish free drainage.

In intra-abdominal suppuration an appendiceal abscess was taken as an example of drainage. The remainder of the abdominal cavity is walled off with sponges, the abscess opened widely, its contents evacuated and the appendix removed. The walls of the abscess are swabbed with moistened sponges until clean. Unless there is hemorrhage the abdomen is closed without drainage. If pus is found in the pelvis it is sucked out and the pelvis cleaned with moist sponges until the exudate moistening the sponge is free from foul odor. Loose flakes of lymph are removed, adherent ones not interfered with. The abdomen is closed without drainage. Since the war several hundred cases of acute appendicitis have been operated; one in fourteen was drained. The mortality in drained cases was 90 0/0, undrained cases 5 0/0. The two conditions where intra-abdominal drains are indicated are: (1) persistent oozing of blood from the surface of an abscess cavity and a condition of the patient necessitating rapid operation; (2) a shaggy irregular lining covering the surface of the abscess. A rubber drain is usually placed at each angle of the wound down to, but not into, the peritoneal cavity. The author believes secondary abscess formation, fecal fistula, septic pneumonia, etc., complicate drained cases more than those not drained.

In scalps and cerebral wounds in the last war, drainage was instituted to prevent or eradicate infection and do away with cerebral edema. This seemed to promote the evils which were meant to be avoided. Later in the war the missile, if still in, was removed, secondary deleterious matter removed and a drain inserted down to, but not into, the brain tissue. These patients did better and less scar tissue was formed in the brain.

In the cases where injury or infection was around a joint, death or amputation followed many cases where drainage was instituted. Later drainage was placed down to, but not into, the joints and then Willem's treatment was established early and then patient encouraged to move the joint in every way. Here, too, better results were obtained.

The next field is thoracic surgery. The development of thoracic surgery during the war was the result of two methods of treatment of which "no drainage" was one. In sucking wounds, the patient had great respiratory distress and the mortality was high. The patients had to have immediate operation or it resulted fatally. The lacerated tissues were excised, the wound in the lung attended to, foreign bodies removed, the pleural cavity wiped clean, and the wound closed without drainage. It was found that often-times in cases with no drainage the lung expanded in twenty-four hours, so no difference could be elicited on auscultation. An exploring syringe was introduced every one or two days to see that no fluid collected in the pleural cavity. Some empyema cases had wide excision of a rib, adherent lung freed, pleural cavity cleaned and closure without drainage and good results. It is hoped that it may be proven in the future that drainage of the pleural cavity may be dispensed with as safely as in the abdominal cavity.

L. D. POWELL.

THE TREATMENT OF SPASTIC PARAYLSIS: Chas. E. Dowman and Michael Hoke (Arch. of Surgery, July, 1924). 132 cases of spastic paralysis were studied, and were grouped, according to the nerve systems primarily involved, into three types.

1. Pyramidal tract cases.—These present an upper motor neuron paralysis, with spasticity, exaggerated tendon reflexes, patella or ankle clonus, Babinski's reflex, paresis of movements, etc. These develop various deformities, due to muscle contractions.

2. Extrapyramidal cases.—These show involvement of the subcortical motor centers in the corpus striatum, or the lenticular and cordate nuclei. These seem to govern the performance of certain automatic acts and associated movements, even when injury to the pyramidal system results in loss of all voluntary motor power. These cases cause not spasticity, but a rigidity which occurs only on excitement and on effort. Inability to perform co-ordinated movements, such as walking, feeding one's self, grasping and moving an object, as well as athetosis result. The deep reflexes may not be increased; there is no ankle clonus or Babinski.

3. Mixed pyramidal and extrapyramidal tract cases.—These indicate lesions in both systems, and so present symptoms mentioned in both of the above groups.

The treatment used could be applied only to the cases of pure pyramidal tract lesions, as inability to perform co-ordinated movements would render the results useless. A mentality of not less than four years was also considered requisite in order to get favorable results. The treatment consists of three important features, namely:

(1) An attempt to restore proper muscular balance by weakening through neurectomy those groups of muscles which outweigh in muscular strength the opposing groups.

(2) Correction, through orthopedic procedures, of joint deformities and the stabilization of the feet.

(3) Muscle training exercises. Neurectomy is performed close to the entrance of the nerves involved, to the contracted or spastic muscles, and a portion of the nerve resected.

The orthopedic procedures included osteotomy, tendon lengthening or shortening, joint immobilization by producing bony ankylosis, etc.

Daily, regular exercises, with massage, to stimulate the weak muscles, are very essential as after-treatment.

THOMAS MYERS.

PEDIATRICS

SUPERVISORS:

CHESTER A. STEWART,
LA SALLE BLDG., MINNEAPOLIS

ROY N. ANDREWS,
MANKATO CLINIC, MANKATO

THE PREVENTION OF SCARLET FEVER: Geo. F. Dick, M.D., and Gladys Henry Dick, M.D. (Journal A. M. A., 83-84, 1924). The authors' own negative results and those of previous workers convinced them that animals are comparatively insusceptible to the disease; and that if they were to overcome the obstacle that had blocked the work of other investigators for so many years, it would be necessary to use human volunteers for the production of experimental scarlet fever.

Blood cultures had failed to reveal any organism present constantly enough to indicate a causal relation. In order to verify, so far as possible, their conclusion that the specific organism of scarlet fever is not, as a rule, present in the blood stream, the first volunteers were inoculated subcutaneously with fresh blood serum and fresh whole blood from early cases of scarlet fever. The results were negative.

This experiment furnished evidence that the experimental disease had not been caused by a filtrable virus, but by the hemolytic streptococcus itself. These first cases of experimental scarlet fever were reported Oct. 6, 1923.

Since the hemolytic streptococcus is found in the throat, and is not usually present in the blood, it is evident that the rash is not produced by the direct action of the streptococcus on the skin. And it was important to learn by what means the organism growing in the throat caused the rash. They found that the streptococcus produced a soluble toxin. This toxin is absorbed into the blood, and causes the nausea and vomiting, and the rash.

When small amounts of this toxin are injected into susceptible persons, they may develop general malaise, nausea, vomiting, fever and a scarlatinal rash. These symptoms appear within a few hours after the injection and disappear within forty-eight hours. Following this reaction, the skin test is negative or only slightly positive.

The prevention of scarlet fever, after exposure, is more complicated. In case of definite exposure, skin tests are made as soon as possible. At the same time, a culture of the throat is made on blood agar plates. If the skin test is negative, nothing more is done. In those with positive skin tests, the next step depends on the throat culture. If the plates show no hemolytic streptococci, active immunization is carried out with three doses of toxin. If the throat culture shows hemolytic streptococci, passive immunization is accomplished by injection of convalescent scarlet fever serum. They use convalescent serum to avoid sensitization to horse serum.

R. N. ANDREWS, M.D.

MODERN CONCEPTION OF SCARLET FEVER: Abraham Zingher, M.D., New York (Journal A. M. A., 83-432, 1924). The conception of scarlet fever held by many observers at the present time is that of a local disease of the nasopharyngeal mucous membrane, caused by certain specific strains of the hemolytic streptococcus. A soluble toxin is produced locally, which is absorbed into the system of the patient, and gives rise to the rash and constitutional symptoms.

The Dick test consists of the intracutaneous injection of from 0.1 to 0.2 c.c. of a dilution of the soluble toxic filtrate obtained from a culture of the specific hemolytic streptococcus. The diluted toxin keeps well, and can be distributed in this form ready for the test. The positive reaction begins to appear in from four to six hours, and reaches its maximum in size and intensity within twenty-four hours after the injection. There is a local area of redness, varying in size from a 5 cent to a 25 cent piece. The Dick test is a reliable index of immunity and susceptibility to scarlet fever.

Scarlet fever is a combined toxic and bacterial infection, caused by a specific hemolytic streptococcus. The immunity following an attack of scarlet fever is antitoxic and not to any extent antibacterial. This is shown by the fact that convalescent patients, who give a negative Dick reaction, may develop secondary septic complications produced by the specific streptococcus. A permanent antitoxic immunity following the disease explains the freedom from second attacks of clinical scarlet fever. It is possible, however, that subsequent infections without a rash caused by the specific streptococcus may occur in those who have recovered from an attack of scarlet fever. Such infections may also occur in those who give a negative Dick reaction.

Active immunization with scarlet fever toxin is a safe procedure, and is not to any extent associated with the development of constitutional symptoms, if the dose of the toxin is gradually increased. The amount is most conveniently increased by the skin test dose, the quantity injected representing 100, 250 and 250 skin test doses for children under 12 years, and 100, 250 and 500 skin test doses for persons over 12 years of age. The injections are given one week apart. The immunity results as shown by the Dick test in checking up on the immunity results with scarlet fever toxin.

Recently the author has been giving 500 skin test doses as the third dose to children over 3 years of age. For adults, 1,000 skin test doses may be used for the third injection. The toxin is diluted so that each cubic centimeter represents 500 skin test doses. The initial dose is 0.2 c.c.; the second dose, 0.5 c.c.; and the third dose, 0.5 or 1 c.c., depending on the age of the person When a large group is to be injected with the same dose, a dilution of the toxin is made of such strength that 1 c.c. represents 100,250 or 500 skin doses.

The reactions noted have been as a rule largely local and consist of a certain amount of redness and swelling at the site of injection. The second and third doses, although from two and one-half to five times as great as the first one, are followed, as a rule, only by very slight local reactions.

R. N. ANDREWS, M.D.

THE PATHOLOGY OF THE TONSIL: James A. Davis, A.M., M.D. (Annals of Otology, Rhinology and Laryngology, September, 1924). The posterior mass or pharyngeal adenoid tonsil develops first and reaches maturity ordinarily by the fourth year; the lateral or faucial tonsil between the sixth and twelfth years. A distinct involution process is recognizable usually in the last named period. The lateral circular mass or meatal eustachian tonsil is perhaps at its maximum of growth at 13 to 16 years. The anterior mass or lingual tonsil is the last to develop—at 18 to 21 years. The complete cycle of the lymphoid ring development corresponds closely with that of the thymus, pituitary and thyroid group.

Predisposition to infections after tonsillectomy is affirmed by Zahorsky, Sluder and Barnes for the earlier years of life (six months to five years). Barnes has observed that normal tonsils were a help in childhood. Turner says a large ingestion of bacteria is continually going on through the subepithelial lymphatic glands, possibly accompanied by an immunization of the body against their invasion.

After interested and critical attention to the bacteriologic gross and microscopic examination of tonsil tissue presented as surgical and pathologic material from three large Detroit hospitals for a period of five years, also after considerable autopsy work, the author is unable to conclude that tonsil tissue has anything like the degree of pathology attributed to it.

The gross and histopathologic examinations of large groups of tonsils show conclusive evidence that if the same criteria for inflammatory and degenerative changes rendering tissue non-resistent elsewhere in the body are to be applied here, then it is beyond question entirely safe to state most positively: non-pathologic tonsils are removed more frequently and in larger numbers than any other tissue of the body. The indications for removal have, in a great number of instances, received but scant consideration, and scientific data concerning the ultimate end results are very meager when contrasted with the numerical total of tonsillectomies—the most frequently and commonly performed of all surgical operations.

The evidence that the tonsil tissue is biologically an important link in the developmental, protective and mechanical chain of essentials of life, well along into the adolescent period, is most convincing. Its relation to the lymphatic and endocrin systems is quite intimate.

The removal of the posterior (adenoid) and the lateral (palatine) tonsil tissue before the natural maturity period is reached is quite frequently followed by compensatory replacement effort in disadvantageous anatomic positions and by nutritional dysfunctions.

A simple classification of lacunar (cryptic or superficial), parenchymatous and peritonsillar inflammations would aid diagnosis and unify interpretations of the histopathology.

The available defenses of the tonsil may be definitely affirmed as including an intact stratified epithelium, actively hypertrophying and hyperplastic follicles, oxidizing and reducing cellular activities.

Removal of adenoids before four years, and the palatine tonsil before puberty, gives a liability to pathology in development processes and local nutrition efficiency.

R. N. ANDREWS, M.D.

GYNECOLOGY AND OBSTETRICS

SUPERVISORS:
ARCHIBALD L. McDONALD,
FIDELITY BLDG., DULUTH
L. W. BARRY,
LOWRY BLDG., ST. PAUL

PHENOLTETRACHLORPHTHALEIN TEST OF LIVER FUNCTION IN THE TOXEMIAS OF PREGNANCY: Judson A. Smith, M.D. (American Journal of Obstetrics and Gynecology, 1924, viii, 298). Smith briefly reviewed the history of the phenoltetrachlorphthalein test for hepatic function. The technic of the test, which is essentially that of Rosenthal, was made on twenty normal pregnant women, and on forty-four patients with toxemia of pregnancy, characterized by hypertension and albuminuria, and included eight patients who probably had chronic nephritis, and seven who had convulsions. The average return of the dye for the normal pregnant woman near term was 4 per cent after fifteen minutes, a trace (less than 2 per cent) after one hour, and none after two hours. Occasionally, there was slight retention of the dye in clinically normal pregnant women, that is, 5 per cent after fifteen minutes, 5 per cent after one hour, and none after two hours. Smith believes that the limit of normal is 7 per cent after fifteen minutes, 3 per cent after one hour, and a very slight trace after two hours. In about half of the patients with toxemia, there was a definitely abnormal retention of the dye. Marked albuminuria and severe symptoms, including convulsions, are much more common in this group, and the mortality was much higher than in the group of persons with normal reactions.

It was found that most of the patients with unquestionable chronic nephritis fell into the group of those having normal reactions. Following recovery from the toxemia, there was a return to normal excretion of the dye within two weeks. In a few cases, an improvement in the ability to excrete dye has been observed before delivery. In four fatal cases, in which an abnormal reaction had been obtained, and in which postmortem examination of the liver was possible, some evidence of hepatic damage was found, although it was not always proportionate, even roughly, to the degree of retention of the dye. In one case in which a normal test was obtained, the patient died, and necropsy disclosed slight necrosis of the liver.

Smith concludes that definite abnormal retention of the dye in a case of toxemia of pregnancy indicates that the toxemia is severe, and also that it is of the pre-eclamptic rather than of the nephritic type, but that the degree of retention of the dye does not appear to be a reliable index of the extent of actual necrosis of the liver. A normal reaction, on the other hand, is of doubtful value unless it is obtained several days before delivery, or obtained repeatedly until close to the time of delivery.

L. M. RANDALL.

BEITRAG ZUR KENNTNIS DER ANAMIEN IN DER SCHWANGERSCHAFT: Albert Adler (Zeitschrift fur Geburtschulfe und Gynakologie, vol. 87, 505). Adler points out the lack of general knowledge with regard to anemia in pregnancy and in the puerperium, and also with regard to the relationship between pregnancy and hematopoiesis. The following classifications are made:

Anemias with pregnancy: Existent anemia or predisposition to anemia as a result of the functional weakness of bone marrow, or changes due to similar diseases of the blood. This group includes:

Chlorosis.

Posthemorrhagic anemia.

Familial hemolytic jaundice.

Pernicious anemia (present before conception).

Leukemias (myelogenous and lymphatic).

Anemia and pregnancy: Relative insufficiency due to hereditary taint, partial toxic hypofunction and dysfunction, or hemolytic action. This group includes:

Physiologic anemia of pregnancy, Grams (the usual condition of the blood in pregnancy).

Pernicious anemia of pregnancy (pseudo-pernicious anemia).

The author asserts that most of the reported cases of true pernicious anemia in pregnancy will not stand close scrutiny. In the cases which fall under the heading "Anemias and pregnancy," Adler finds that in every history it will appear that, at an earlier period in the patient's life, chlorosis, severe anemia, syphilis, or other severe infection had occurred. He sees in this condition a reaction of a functionally weak bone marrow, to a pathologic, and even physiologic influence of pregnancy.

L. M. RANDALL.

ROENTGENOLOGY

SUPERVISORS:
LEO G. RIGLER,
MPLS. GEN'L HOSPITAL, MINNEAPOLIS
A. U. DESJARDINS,
MAYO CLINIC, ROCHESTER

CHRONIC STENOSIS OF THE DUODENUM: N. Ratkoczi (Amer. Jour. of Roent., vol. 12, p. 246, Sept., 1924). In 4,500 gastric examinations the author has observed 29 cases of duodenal stenosis. The "persistent" cases may be due to: (1) adhesions from a laparotomy, tuberculosis, or peritonitis; (2) tumors of the stomach, pancreas, or retroperitoneal glands.

In the roentgen examination of the persistent type, there is a constant but thin flow through the duodeno-jejunal junction. Antiperistalsis is present with return of food into the stomach and there is retention in both the stomach and duodenum.

The "intermittent" cases are due to: (1) movable tumors; (2) pressure of the mesentery or superior mesenteric artery; (3) reflex spasm. During the roentgen examination the contrast material fills the dilated duodenum to the junction, where it is completely obstructed. Peristalsis and antiperistalsis continue until suddenly the meal pours on into the jejunum. Emptying continues to take place in this manner.

In both types, the duodenum is dilated, the stomach atonic, the Kerkring folds obliterated.

LEO G. RIGLER, M.D.

THE SIGNIFICANCE OF ROENTGENOGRAPHIC PLEURAL ANNULAR SHADOWS: Amberson (Tubercle, Aug., 1924). A review of the literature on this subject is presented. The author presents evidence based upon autopsic and clinical evidence as well as roentgenographic to prove that not all annular shadows are due to cavities. If roentgen examination is made at frequent intervals these shadows in many instances can be seen to grow smaller or disappear in a few months. This never occurs with a true cavity, which may grow smaller in a long period of time, but never entirely disappears.

The author believes these shadows are localized pleurisies rather than localized pneumothoraces. Their roentgenographic appearance, location, the clinical accompaniments, the known great frequency of localized pleurisies all tend to indicate that these are isolated areas of pleural inflammation. The known infrequency of lung rupture and the rare occurrence of purulent effusion in these localized areas are evidence against their being localized pneumothoraces. The fact that these shadows increase in size with increase in the lung process beneath them, and fade with subsidence of this activity, also indicates the pleural origin.

LEO G. RIGLER, M.D.

A NEW METHOD FOR ROENTGEN EXAMINATION OF THE DUODENUM: N. Ratkoczi (Jour. of Radiology, vol. 5, p. 264, Aug., 1924). Fluoroscopy is sufficient to demonstrate all lesions of the duodenum. The patient is viewed in the lateral position with the rays directed dextrosinistrally, in the vertical fluoroscope. By this method the bulbus duodeni is clear of the spine, the stomach, the descending portion of the duodenum, the liver and the kidney. It has as its background the hepatic flexure, which, containing gas, gives sharp contrast. The whole duodenum can be seen by rotating the patient slightly to the right or left.

Occasionally filling of the bulb is obtained by having the patient lie on the right side and when necessary the examination can be done in this position. The author believes he can detect the smallest crater in the bulb during the fluoroscopic examination.

LEO G. RIGLER, M.D.

PULMONARY FIBROSIS: Davis (Radiology, Aug., 1924). A thorough discussion of the etiology, pathology, roentgen signs, and literature of the various types of this condition is presented.

The author believes that the fibrosis reported as due to intensive roentgen radiation is still not conclusively proven. Primary carcinoma must be differentiated.

LEO G. RIGLER, M.D.

PHYSICIANS LICENSED AT THE OCTOBER (1924) EXAMINATION TO PRACTICE IN MINNESOTA

Upon Examination

Name	*School and Date of Graduation*	*Address*
Brading, Edward Thurston	Harvard, M. D., 1923	Rochester, Minn.
Burns, Arthur	Johns Hopkins, M. D., 1923	Rochester, Minn.
Coffey, Jay Russell	U. of Ore., M. D., 1923	Rochester, Minn.
Felden, Botho	U. Berlin, Ger. Dr. Med., 1914	2012 Hennepin Ave., Minneapolis.
Flothow, Paul Geo.	U. of Pa., M. D., 1923	Rochester, Minn.
Grob, Otto	U. Vienna, Dr. Med., 1923	Rochester, Minn.
Horwitz, Alec	Geo. Wash. U., M. D., 1923	Rochester, Minn.
Kerlanski, Milton	U. of Minn., M. B., 1924	Swedish Hospital, Minneapolis.
McCarty, Virgil	Ind. U. Sch. of Med., M. D., 1924	Ancker Hospital, St. Paul.
Moskovitz, Selic	U. Geneva, Switzerland, Dr. of Med., 1922	1026 Iglehart Ave., St. Paul.
Nelson, Nels Harvey	U. of Minn., M. B., 1924	General Hospital, Minneapolis.
Nutting, Roland E.	U. of Minn., M. B., 1924	General Hospital, Minneapolis.
Rosenthal, Robert	U. Vienna, Dr. Med., 1922	Lowry Building, St. Paul.
Rygh, Edgar A.	Rush, 4 yr. cert. Med., 1924	Ancker Hospital, St. Paul.
Sager, Wm. Warren	Geo. Wash. U., M. D., 1922	Rochester, Minn.
Setzer, Geo. Warren, Jr.	Rush, 4 yr. cert. Med., 1923	Ancker Hospital, St. Paul.
Schnarrenberger, Gottfried Karl Friedrich	U. Heidelberg, Dr. of Med., 1919	Rollingstone, Minn.

Through Reciprocity

Ash, Wilfrid A.	Creighton, M. D., 1923	Rochester, Minn.
Basinger, Homer P.	N. W., M. D., 1924	Windom, Minn.
Bofenkamp, Ferdinand W.	St. Louis U. Sch. of Med., M. D., 1922	Luverne, Minn.
Bratrude, Amos	U. of Ill., M. D., 1924	Starbuck, Minn.
Chambers, Stanley O.	U. of Mich., M. D., 1923	Rochester, Minn.
Critchfield, Lyman Ray	U. of Minn., M. D., 1909	936 Lowry Building, St. Paul.
Duncan, Perry E.	Wash. U., M. D., 1924	St. Luke's Hospital, St. Paul.
Harshbarger, Isaac L.	U. of Va., M. D., 1922	Rochester, Minn.
Horton, Vincent J.	U. of Iowa, M. D., 1923	Preston, Minn.
Johnson, Henry P.	Bowdoin, M. D., 1921	Rochester, Minn.
Kertesz, Gesa Joseph Victor Emil	Hungarian Royal Univ., Dr. of Med., 1918	1835 Park Ave., Minneapolis.
McDonell, Charlie H.	Bennett Coll. of Ecl. Med. & Surg., M. D., 1906	Hankinson, N. D.
McQuiggan, Mark Ronald	U. of Pittsburgh, M. D., 1923	Rochester, Minn.
Melson, Madeline Ann M.	U. of Cal., M. D., 1924	Rochester, Minn.
Ochsenhirt, Norman C.	U. of Pittsburgh, M. D., 1917	Rochester, Minn.
Prickman, Louis E.	U. of Pittsburgh, M. D., 1923	Rochester, Minn.
Sadler, Wm. Paul, Jr.	Johns Hopkins, M. D., 1921	Maryland Hotel, Minneapolis.
Stevenson, Geo. S.	Johns Hopkins, M. D., 1919	133 Millard Hall, Univ. of Minn.
Synhorst, Alfred Paul	U. of Ia., M. D., 1922	Rochester, Minn.
Thompson, John Wm., Jr.	Wash. U., M. D., 1923	Rochester, Minn.
Vivian, Robert S.	Rush, M. D., 1922	Hibbing, Minn.
Wilkinson, Henry Fielding	Yale, M. D., 1921	Rochester, Minn.

BOOK REVIEWS

BOOKS RECEIVED FOR REVIEW

ANESTHESIA FOR NURSES. Col. Wm. Webster, D.S.O., M.D., C.M., Professor of Anesthesiology, University of Manitoba Medical School, etc. 153 pages. Illus. Cloth, $2.00. St. Louis: C. V. Mosby Co., 1924.

LECTURES ON PATHOLOGY. Ludwig Aschoff, M.D., Professor of Pathologic Anatomy, University of Freiburg, Germany. 365 pages. Illus. Cloth, $5.00. New York: Paul B. Hoeber, 1924.

PHYSICAL DIAGNOSIS. W. D. Rose, M.D., Lecturer on Physical Diagnosis and Associate Professor of Medicine, University of Arkansas; Visiting Physician, Little Rock City Hospital, Baptist Hospital and St. Vincent's Infirmary, Little Rock, Ark. 4th ed. 319 illus. 755 pages. Cloth, $8.50. St. Louis: C. V. Mosby Co., 1924.

CONCEALED TUBERCULOSIS OR THE TIRED SICKNESS. George Douglas Head, B.S., M.D., Minneapolis. 137 pages. Illus. Cloth, $2.00. Philadelphia: P. Blakiston's Son & Co., 1924.

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES for the fiscal year 1924. 310 pages. Illus. Washington: Government Printing Office, 1924.

GENERAL MEDICINE. The Practical Medicine Series, Vol. I. Edited by George H. Weaver, M.D., Lawrason Brown, M.D., Robert B. Preble, M.D., Bertram W. Sippy, M.D., Ralph C. Brown, M.D. 736 pages. Illus. Chicago: The Yearbook Publishers, 1924.

THE SCIENCE AND ART OF ANESTHESIA. Col. Wm. Wilster, Winnipeg. 214 pages. Illus. Cloth, $4.75. St. Louis: C. V. Mosby Co., 1924.

The author of this book begins his discussion of anesthesia with a very comprehensive review and history of the subject, beginning with the work of the early Egyptians, down to the present methods of anesthesia. The history itself is interesting and entirely worth while reading.

The author then writes to some extent on the physiology of anesthesia, discussing the effects of the various anesthetics used on the heart, blood-vessels, kidneys, nerve tissue, the elimination of the anesthetic and the theories as regards narcosis.

The book then deals with each type of anesthesia and the various anesthetics—ether, chloroform, nitrous oxide, ethylene, ethyl chloride, ethyl bromide, and somnoform—describing the action of each, the advantages and disadvantages of the various anesthetics. The author also has a short chapter devoted entirely to bowel-anesthesia.

One of the finest chapters in the book is the one entitled "Selection of the Anesthetic." This is indeed a worth-while chapter in which the author explains that certain anesthetics will not always suffice for certain types of operations or in every type of individual, regardless of the operation. Therefore we must pick our method of narcosis to suit the condition both from the standpoint of the operation to be performed and the patient.

In closing, the author gives a short discussion of post and pre-operative management, surgical shock, the art of anesthesia, a few statistics comparing the use of the various anesthetics, and lastly the medico-legal aspect of anesthesia.

M. W. ALBERTS, M.D.